CULTURAL RESOURCES SURVEY AND LITERATURE REVIEW OF BELLE FOUNTAIN DITCH AND TRIBUTARIES DUNKLIN AND PEMISCOT COUNTIES, MISSOURI AND MISSISSIPPI COUNTY, ARKANSAS

By

John E. Keller

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CULTURAL RESOURCES SURVEY AND LITERATURE REVIEW

OF BELLE FOUNTAIN DITCH AND TRIBUTARIES

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AND

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ABSTRACT

In late 1982, New World Research, Inc. was awarded a contract by the U.S. Army Corps of Engineers, Memphis District, to conduct a literature and background search and intensive survey of Belle Fountain Ditch and Tributaries. The project corridor crosses portions of three counties in two states: Dunklin and Pemiscot counties, Missouri, and Mississippi County, Arkansas. The area of proposed impact was inspected by both pedestrian and boat survey, using state-of-the-art techniques. Only one site (23PM568), a non-diagnostic prehistoric lithic scatter, was recorded in addition to two historic cemeteries and modern standing structures. The thrust of interpretations on this study was directed toward evaluating the low incidence of sites in the survey area and scrutinizing any area in which efforts toward avoidance should be directed.

ACKNOWLEDGMENTS

The author wishes to thank the cooperation of the Contracting Officer's Authorized Representation, Mr. Doug Prescott of the U.S. Army, Memphis District Corps of Engineers. In addition, other members of the COE Memphis District provided invaluable aid with regard to engineering specifications. The Belle Fountain Ditch and Tributaries project was conducted during December, 1982 and January, 1983 under sometimes adverse weather conditions. For this reason, the author would like to sincerely thank the project crew members, who included at various times, George Burns, Robert Lauderdale and Jeffrey Homburg. The local residents of Dunklin, Pemiscot, and Mississippi counties provided both information and support; in particular Mr. John H. Smith. Finally, a word of thanks to the staff of New World Research, including Prentice Thomas, Jan Campbell, Carol Weed, Susan Keuer-Jones, Joyce Barnhill and Renee Morrison.

CHAPTER ONE

INTRODUCTION

In 1982, the The U.S. Army Corps of Engineers, Memphis District awarded a contract (No. DACW66-82-C-0087) to New World Research, Inc. (NWR) to conduct a background and literature search and intensive cultural resources survey investigation of Belle Fountain Ditch and Tributaries, Mississippi County, Arkansas and Dunklin and Pemiscot counties, Missouri. These tasks are in partial fulfillment of the Memphis District's responsibilities and obligations under the National Historic Preservation Act of 1966 (Public Law [P.L.] 89-665); the National Environmental Policy Act of 1969 (P.L. 91-190); Executive Order 11598, "Protection and Enhancement of the Cultural Environment," 13 May 1971 (36 F.R. 3921); Preservation of Historic and Archaeological Data, 1974 (P.L. 93-291); and the Advisory Council on Historic Preservation, "Procedures for the Protection of Historic and Cultural Properties" (C36 CFRV111 Part 800).

PROJECT AREA: A BRIEF DESCRIPTION

As indicated by Figure 1, the Belle Fountain Ditch and Tributaries Channel Enlargement Project encompasses portions of three counties: southwestern Pemiscot County, Missouri; southeastern Dunklin County, Missouri; and north-central Mississippi County, Arkansas. Drainage of this project is generally southwest and is connected either directly or indirectly with the abandoned crevasse channel of the Mississippi River known as Pemiscot Bayou in the project area (Saucier 1974).

The upstream periphery of the drainage system project area extends from southwestern Caruthersville, Missouri, to areas southeast of

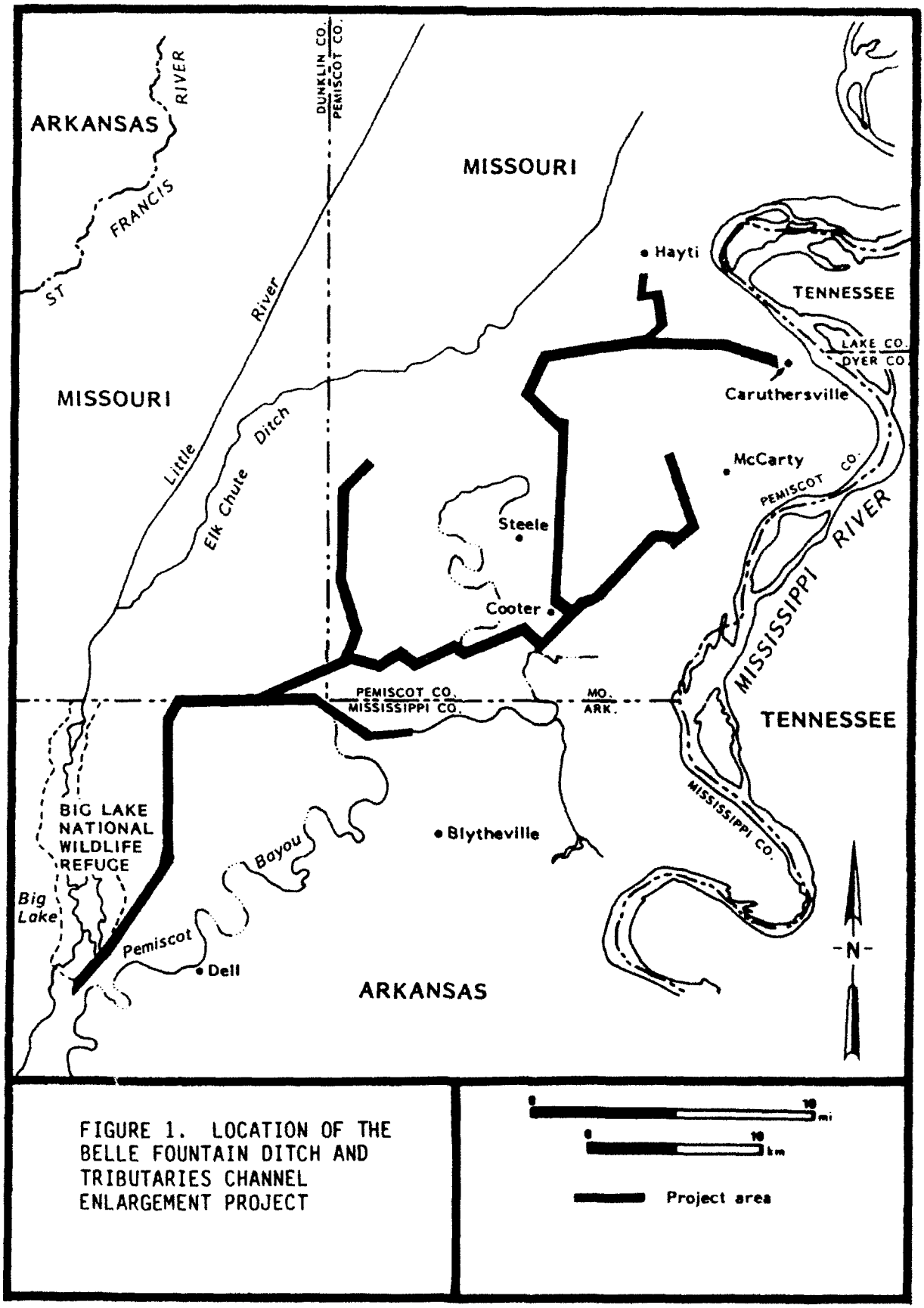

FIGURE 1. LOCATION OF THE BELLE FOUNTAIN DITCH AND TRIBUTARIES CHANNEL ENLARGEMENT PROJECT

Hayti, Missouri. From there, the main channel follows Main Ditch Number 6 south and west to Steele and Cooter, Missouri, where it joins the Belle Fountain Ditch, Ditch Number 5 and New Franklin Ditch system. A second portion ascends New Franklin Ditch east and Lateral Ditch 2-3 from this point east and north to a point approximately two miles northwest of McCarty, Missouri.

The main drainage system then descends from Cooter southwest along Belle Fountain Ditch, and augmented by the generally north-south drainage of Main Ditch Number 9, converges into the State Line Outlet Ditch near the border of Dunklin County, Missouri, and Mississippi County, Arkansas. At this point the Belle Fountain State Line Outlet Ditch converges once again with Pemiscot Bayou (which was also surveyed to the Interstate 55 crossing just east of Yarbro, Arkansas). It turns south and slightly west along the eastern boundary of the Big Lake National Wildlife Refuge until the final terminus with the Right Hand Chute of the Little River just south of the Refuge and Arkansas Highway 18. A drainage system of this complexity is best and most easily described in terms of segments (Note: Figure 1 presents the general configuration of the project lines. Detail figures are presented in Chapter Six, Figures 18 through 23). Segment descriptions are based on the Memphis District terminology as augmented by topographic and geographic data.

Segment - State Line Outlet Ditch (SLO)

This segment follows the present ditch from its terminus with the Right Hand Chute of Little River for 12.25 mi (19.71 km)[1] to the juncture with State Line Ditch Number 29 (SL-29). The proposed project consists of a series of enlargements of the existing channel which will impact areas on both sides of the present ditch that vary in width from 39 ft (11.8 m) to 400 ft (12.2 km).

Segment - State Line Ditch Number 29 (SL-29)

This segment extends from the juncture of the Belle Fountain/State Line Outlet Ditch with State Line Ditch Number 29 (Pemiscot Bayou) up 25L-29 to Yarbro, Arkansas and Interstate 55. Project impact zone varies from 300 ft (91.4 m) on one side to 30 ft (9.1 m) on either side.

Segment - New Connecting Ditch (NCD)

This segment is a 0.27 mi (.43 km), 440 ft (134.1 m) wide section connecting SL-29 and Belle Fountain.

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[1]In the text the metric system is the primary measurement. Where we have used Corps supplied information, the English measures are used with metric equivalents in parentheses.

Segment - Belle Fountain Ditch (BF)

This segment extends up the existing Belle Fountain Ditch from the junction with NCD on the Arkansas/Missouri border to the junction with Main Ditch Number 9 at mile 6.29. The area impacted will all be one side and/or the other with width of the impact zone varying from 100 ft (30.4 m) to 330 ft (100.5 m).

Segment - Main Ditch 9 Consolidated District 1 (M9C1)

This segment will enlarge the left bank only from the junction with Belle Fountain up the ditch to mile 7.31. Width of project impact area varies from 210 ft (64 m) to 400 ft (121.9 m).

Segment - Main Ditch of DD6 (M-6)

This is a left bank ascending only enlargement from the Belle Fountain, M9C1, M-6 junction up Belle Fountain/Main Ditch 6 to mile 6.0 and junction with the channelized Pemiscot Bayou (Main Ditch Number 6).

Segment - Lateral 5 of DD6 (L5-6)

This segment will impact a zone 300 ft (140.2 m) wide on the left bank ascending up Belle Fountain and Ditch Number 5. The segment is from the junction of Belle Fountain and M-8 for 4.65 mi (7.48 km) to the junction of New Franklin Ditch and Bypass Steele (BPS) at the town of Cooter.

Segment - Bypass Steele (BPS)

This segment consists of a left bank enlargement, which varies from 310 ft (94.4 m) to 460 ft (140.2 m) for 3.20 mi (5.14 km) up the Main Ditch Number 6. Terminus is just east of the town of Steele, Missouri at the crossing of Missouri Highway 164.

Segment - Main Ditch Number 6 (M6 above BPS)

Segment follows existing M-6 north to mile 22.2 or approximately the crossing of Interstate 55. Project will impact 250 ft (76.2 m) wide corridor on the left bank ascending. From mile 22.2 to mile 23.59 the project involves actual channel clearing to original dimensions.

Segment - Lateral 1 of DD6 (L1-6)

This is also a left bank only enlargement which extends up the present ditch from its juncture with M6 (approximately) Interstate 55) for 4.40 mi (7.08 km). Terminus is approximately the city of Caruthersville.

Segment - East Main Ditch-12 (EM-12)

Segment consists of channel clearing for 1.45 mi (2.3 km). Segment is approximately from M-6 mile 23.59 west to the St. Louis and San Francisco Railroad. This segment crosses I-55, I-275, Missouri Highway J and the railroad south of Hayti.

Segment - New Franklin Ditch - DD6 (NF6)

Segment is a left bank ascending, 250 ft (85.2 m) wide corridor, from Cooter and junction of Main Ditch Number 6, Ditch Number 5 and New Franklin Ditch, to mile 8.5 on New Franklin.

Segment - Main Ditch 3 (M-3)

From New Franklin Ditch mile 8.5 to mile 10.5. Impact area is 250 ft (85.2 m) and only on the left bank ascending.

Segment - Lateral 2 DD3 (L2-3)

A 2.5 mi (4.02 km) long segment north along the existing ditch from its juncture with the New Franklin/Main Ditch 3 system. Project will impact right bank only for 250 ft (85.2 m).

SUMMARY

The intensive survey of the project area was carried out during the period from November 10 to December 14, 1982. In addition to normal foot survey a boat was used to survey the impacted bank line of each project segment. While most of the time during this period was spent in actual fieldwork a number of days were also devoted to literature review, checking courthouse records and talking with local informants (Appendix I - List of Consultants and Informants). Visits were also made to the Arkansas Archaeological Survey Office in Jonesville and to the office of the Missouri State Historic Preservation Officer in Jefferson City.

In addition, the National Register of Historic Places and updates were checked for significant properties in or near the impact zone and a records search for known sites was requested from the Missouri State Historic Preservation Office (SHPO). Although originally a site file search was to be undertaken for the Arkansas portion of this work under a separate purchase order issued by the Memphis District to the Arkansas Archeological Survey, no purchase order was issued because so few sites were involved (Draft Final Review, W. Douglas Prescott to L. Janice Campbell, 28 March 1984:1).

Since the contract (Appendix II - Scope of Work) required use of a non-collection strategy no arrangements were made for the curation of artifacts in either Arkansas or Missouri; however, copies of all field notes have been forwarded to the SHPO offices in Missouri and Arkansas.

In the entire survey area, only one site (23PM568), a prehistoric lithic scatter, was identified. The site significance is indeterminable at the survey level, thus testing is required.

In the following chapters we have synthesized data from the background and literature search, discussed with greater specificity the procedures used in fieldwork, and detailed the results. Of note is our interpretations section, which, because of the relative absence of sites, seeks to explain why this area is not culturally sensitive. In evaluating the paucity of sites, we have relied heavily not only on archaeological explanation, but also upon interpretations offered by our consulting geomorphologist.

CHAPTER TWO

ENVIRONMENTAL CONTEXT

The environment of the project area has been heavily altered by drainage projects and mechanized farming. As we shall see these two interrelated factors are predominant throughout the Belle Fountain project area and their effect on cultural resources is believed to be profound. In this situation reconstruction of past environmental factors is primarily based on archaeological interpretations, historic records and the few remaining bits of undisturbed territory. Even so, however, our paleoenvironmental reconstructions are rather myopic, for despite our knowledge of successional and climatic trends, these are limited to the last 1,500 years or so. It is with these factors in mind that the following discussion is offered.

CLIMATE

The project area has hot, humid summers and relatively mild winters. Climatologists classify this as a Humid Continental Climate Zone. Modern weather records from the U.S. Weather Bureau Stations in Osceola, Arkansas and Caruthersville, Missouri indicate that average temperatures range from about 40°F (ca. 4°C) in January to around 81°F (ca. 27°C) in July. The mean length of the growing season is about 230 days between March 26 and November 10 (Brown 1971; Ferguson and Gray 1971).

Average annual precipitation is about 46 in (116.84 cm) and is evenly distributed throughout the year. Most of this moisture is in the form of rain but a negligible amount of snowfall also occurs

(Brown 1971). The warm temperatures and high precipitation are probably similar to the climate under which the soils were formed (Ferguson and Gray 1971).

QUATERNARY GEOLOGY AND GEOMORPHOLOGY

Introduction

As a whole, the topography of the entire project area might best be described in the vernacular as monotonous. Terrain is generally level or very gently undulating and it is doubtful that relief varies much over ten feet throughout. Greater relief, of course, is evident along all the project ditches due to the effect of levee construction and dredging. The entire project area lies within the Eastern Lowlands of the Mississippi Alluvial Valley Physiographic Province (Fisk 1944).

Drainage, at least until the construction of modern projects, was rather slow. In fact, permanent ponding occurred throughout much of the general area and was especially prevalent in the project area (Brown 1971). In such a damp situation it may come as little surprise that the name Pemiscot derives from an Indian word meaning "liquid mud" (Brown 1971:40).

In the past 100 years the changes wrought by humans on the landforms of the Mississippi River Alluvial Valley have become increasingly evident, masking the reciprocal effects of the landforms on their human inhabitants. The principal goal of the following discussion (see Figure 1) is a reconstruction of the geomorphic history of the project area. The purpose of this study is to provide a geologic perspective to the archaeological questions, where and why are human habitation sites found or not found in the survey area. To these ends, a review of pertinent geologic, geomorphic and archaeological work was followed by analyses of topographic, geologic and pedologic maps, aerial photographs, logs of borings, and archaeological profiles. Geomorphic surfaces (except for buried landforms) interpreted from this information were examined in the field on December 11 and 12, 1982.

Previous Related Studies

Mississippi River dynamics, sediments, and sedimentary processes have been intensively studied by the U.S. Army Corps of Engineers since the mid-19th century. Humphreys and Abbot (1861) made the first major contribution, and the list of publications for the U. S. Army Corps of Engineers Waterways Experiment Station in later years documents the continuing interest in the developmental history of the valley. H. N. Fisk (1944) summarized the corpus of sedimentologic and stratigraphic work, and contributed his own detailed reconstruction of the geomorphic and tectonic history of the Mississippi River alluvial valley. Jordon (1965) addressed similar questions concerning the

sedimentology of the river north of the present study area. Schumm et al. (1972) and Winkley (1976) examined patterns of the meandering river in response to natural and artificial cut-offs.

Most useful to this study has been the work of Saucier (1964) on the geomorphology, stratification, and sediment distribution of the St. Francis Basin; on the problem of chronology of the braided surfaces (1968); and on the problem of the origin of St. Francis Sunk Lands (1970). His summary of the geomorphic history of the Mississippi River Alluvial Valley argued against the basis for and the details of the absolute chronology proposed by Fisk (1944); in turn the loss of definition was balanced by the gain in credibility.

Regional Geology and Geomorphic History

The Mississippi River lies in a broad alluvial valley in a broader physiographic and structural depression, the Mississippi Embayment, which extends northward from the central Gulf Coastal Plain. The major geomorphic elements of this portion of the coastal plain comprise uplands in varying degrees of dissection, flat-floored alluvial valleys, and one or more terraces stepped between the rolling uplands and the valley floors. These features are formed on, and incised into, a series of gently warped and more-or-less uplifted strata of Cretaceous through Holocene ages. The rocks and sediments record 70 million years of gradual southward progradation of deltaic and alluvial deposits over Gulf of Mexico massive sediments. Gentle uplift of the coastal plain north of a "hingeline" (which itself has shifted southward) has allowed streams and rivers to develop extensive drainage systems, and to dissect the sediments and rocks into rolling upland topography.

Approximately three million years ago, a series of global climatic oscillations began (Butzer 1976). In the northern hemisphere these oscillations were characterized by episodes of glacial growth and decay, alternating with intervals of climate similar to that of the present. At their maximum extents, continental glaciers covered most of North America east of the Rocky Mountains and north of the present Missouri and Ohio rivers. A full cycle of extensive glaciation and subsequent return to interglacial climate might have taken place in less than 25,000 years.

During each cycle, as glaciers grew and sea level dropped, the Gulf Coastal Plain rivers and streams entrenched and widened their valleys, cutting deep into their own alluvium and the underlying bedrock. With waning glaciation, as meltwater returned to the oceans, the rivers responded to the rise in sea level (and therefore their base level) by rapidly aggrading their entrenched valleys. Initial deposits were sand and gravel, derived from both glacial outwash sources and from inglaciated source areas where erosion was intensified during the period of lowered base level. As valley slopes and the supply of coarse bedload material declined, the streams and rivers began meandering in relatively restricted courses (meander belts).

The present features of the Mississippi River Alluvial Valley (described in the next section) comprise the active and relict meander belts of the river and its tributaries (Figure 2), backswamp basins, braided surfaces, and isolated narrow ridges. All of these features have been produced (or in the case of the ridges, at least strongly modified) by erosion and deposition in the past 18,000 years.

Landforms and Sediments

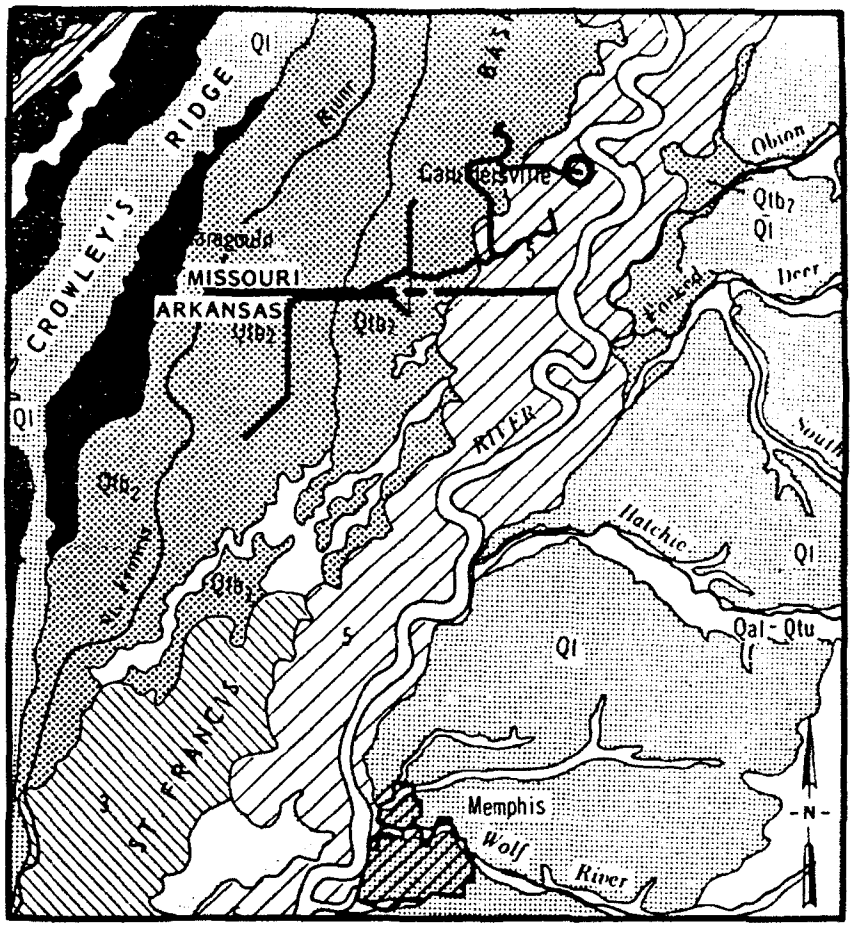
Definitions

The floor of the Mississippi River Alluvial Valley in this region is a mosaic of largely distinct, major geomorphic units which include: 1) the present Mississippi River meander belt; 2) the backswamp basin; 3) the St. Francis River, tributary to the Mississippi River; and 4) braided surfaces. Geomorphologic terms used in this and succeeding sections include: "course" - a portion of a meandering river or stream of unspecified length, but always including more than one meander; "channel" - the area between the banks of a watercourse; "abandoned channel" - a cut-off meander or section of a meander; "present meander belt" - the active meandering course of the Mississippi River, the natural levees and point bars which border it, and the abandoned channels associated with it; "backswamp" - lower area adjacent to a meander belt, in which floodwaters collect; "braided surface" - flat to gently sloping land with many low-relief, elongated rises, separated by swales which split and rejoin in a complex pattern.

Features of the Floodplain

Figure 3 is a cross section (from Saucier 1964), illustrating the following descriptions. The Mississippi River meander belt is an elongated, raised area of the floodplain. It is formed by two ridges, the natural levees, one on each side of the meandering course. Their continuity in this region is broken only by the entries of channels of tributary streams, such as the St. Francis River. Natural levees are highest (the crest of the levee) near the river channel, and they slope gently (the backslope or distal natural levee) away from the crests. Backslopes merge imperceptibly with backswamps. Levee crests stand five to six meters higher than neighboring backswamps. Backswamp drainage patterns vary from highly irregular, to broadly curved (following the forms of filled and buried abandoned meanders).

Between the natural levee crests lie the river channel, cutbanks, point bar and upper point bar terrain, and recently cut-off meanders. The active channel of the river is bounded by two kinds of features: erosional cutbanks, generally on the outer concave bank of a meander; and depositional, arcuate point bars on the inner, convex bank. Cutbanks and bars also occur wherever local erosional or depositional processes are strong enough to create and maintain them. Cutbanks are rapidly degraded to gentle slopes when eroding currents are no longer directed against them.



ALLUVIUM Undifferentiated on smaller streams; subdivided in Mississippi Valley as follows

MISSISSIPPI RIVER MEANDER BELTS Numbered from 1(oldest) to 5(youngest). Only latest occupation shown.

BACKSWAMP AREAS OR FLOODBASINS Areas of overbank deposition not affected by river migration. Extent of areas exaggerated in the Red and Arkansas River valleys where meander belts are shown by dimensionless symbols.

CHENIER PLAIN Cheniers(relict beach ridges)shown as solid lines and not differentiated according to age.

BRAIDED-STREAM TERRACE 2 Cones of glacial outwash or valley train deposits of the Mississippi, Ohio, and Arkansas Rivers-sublevels delineated but not identified. Both Holocene and Pleistocene deposition represented.

LOESS Principal accumulations of eolian silt-mapped only on uplands in and east of the Mississippi alluvial valley. At least two periods of loess deposition represented. Only loess greater than 10 feet thick mapped in Mississippi.

BRAIDED-STREAM TERRACE 1 Cones of glacial outwash or valley train deposits of the Mississippi, Ohio, and Arkansas Rivers-sublevels delineated but not identified.

UNDIFFERENTIATED TERRACES Includes possibly two depositional or erosional terraces of Pleistocene age plus upland fluvial gravelliferous deposits of late Tertiary or early Pleistocene age. Also may include Prairie or Montgomery terrace equivalents along small streams in Arkansas and Louisiana where correlations have not been made.

FIGURE 2. PRESENT FEATURES OF THE MISSISSIPPI RIVER ALLUVIAL VALLEY IN THE VICINITY OF THE PROJECT AREA (marked by the bold black line).

0 50 km

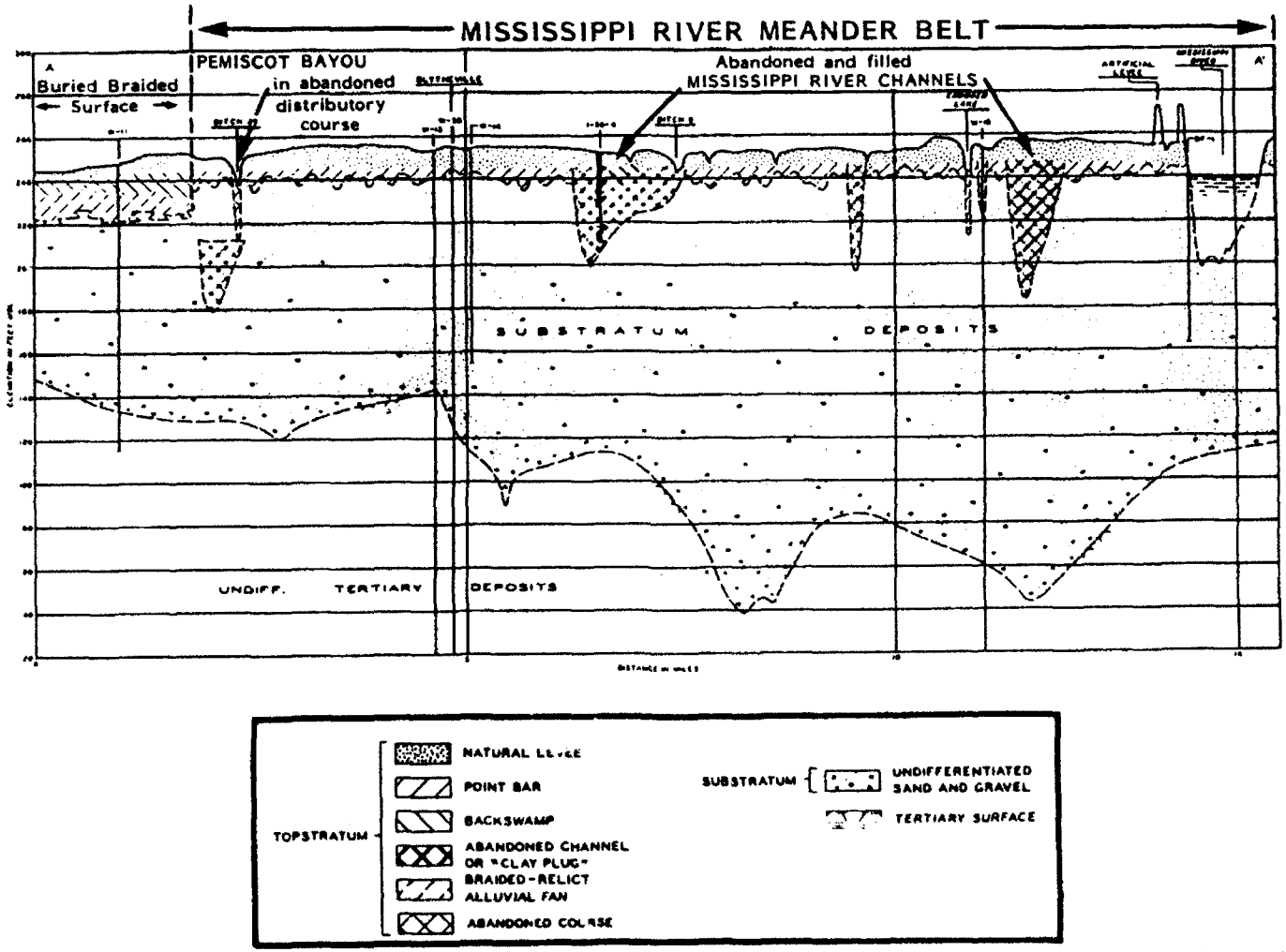


FIGURE 3. CROSS SECTION OF MISSISSIPPI RIVER MEANDER BELT SEQUENCE (for exact location of cross section see continuation page of Figure 3 which follows; from Saucier 1964).

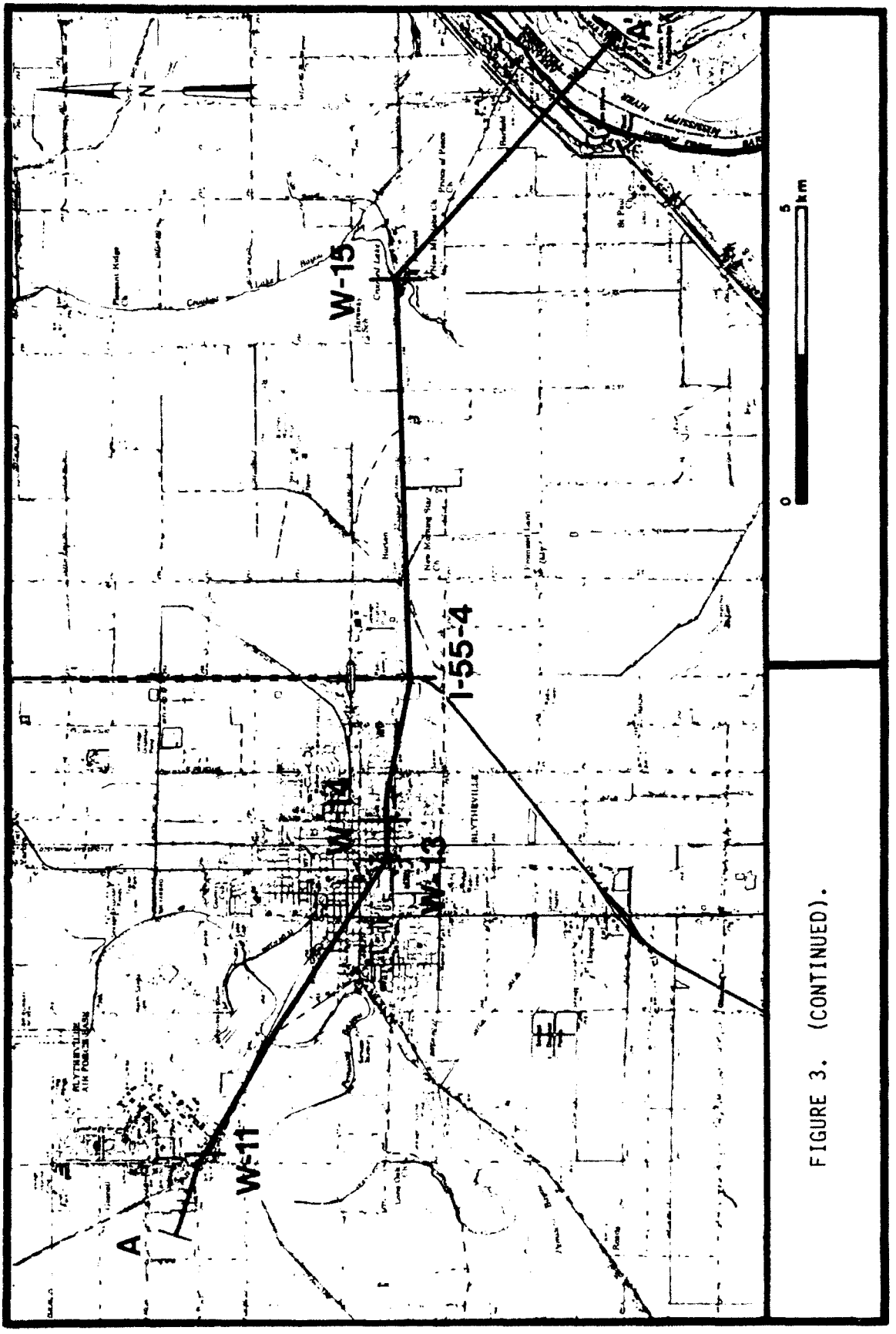


FIGURE 3. (CONTINUED).

Abandoned channels add to the complexity of the area between the outermost natural levee crests. When plugged at both ends, the cut-off channel becomes an oxbow lake; with time they can become filled completely, and buried, as overbank deposition during floods raise the general level of the floodplain. Gagliano et al. (1979) have developed a model for human settlement at oxbow lakes, based on their interpretations of geomorphic and ecologic changes which follow a cut-off.

The backswamp in the study area lies between the present Mississippi River meander belt, and a low terrace with a braided surface some 15 to 20 km to the west (level C terrace of Saucier 1970). Two types of terrain are present at and below the low-lying surface: nearly buried abandoned Mississippi River meanders, and a braided surface (level D of Saucier 1970 with some outliers at level C southwest of Kennet). Little River and Pemiscot Bayou were the major backswamp drainage streams prior to establishment of artificial drainage channels. South of the Belle Fountain area, Little River becomes the Right Hand Chute of the Little River, and Pemiscot Bayou the Left Hand Chute.

Little River and Pemiscot Bayou show their differing origins in the strong differences between the courses. Little River was a narrow, winding, locally meandering stream that followed the south-southwestward trend of one of the major collecting channels of the braided surface. A portion of this old channel is preserved a few kilometers northeast of Hornersville (Figure 4). Big Lake appears to be a ponded area at the base of the transition from level C to level D and Saucier (1970) interpreted the cause of the ponding to have been development of natural levees on the Pemiscot Bayou/Left Hand Chute.

Pemiscot Bayou exhibits fully developed meanders with amplitudes of 1.5 to 2.0 km. Its meander belt includes at least one cut-off meander. The meander belt heads at a short abandoned Mississippi River course approximately six kilometers north-northwest of Steele, Missouri. Saucier (1970) interprets the origin of this stream as a crevasse cut from the Mississippi River to the backswamp. A slight gradient advantage allowed diversion of sufficient Mississippi River flow to cut and maintain a continuous, actively meandering course flanked by natural levees. The St. Francis River joins the course near Marked Tree, Arkansas, beyond which it is called the St. Francis River.

In sum, the grain of the landforms and the drainage in and around the study area is generally northeast to southwest. The Mississippi River meander belt lies against the uplands which form the eastern side of the alluvial valley. To the west, the backswamps on buried portions of the meander belt and the lowest braided surface (level D) is succeeded by three slightly higher, slightly drier braided surface levels to the foot of Crowley's Ridge. This other feature of the region must be mentioned, although it lies at least 30 km west of the Belle Fountain project. Crowley's Ridge, which rises 200 m above the

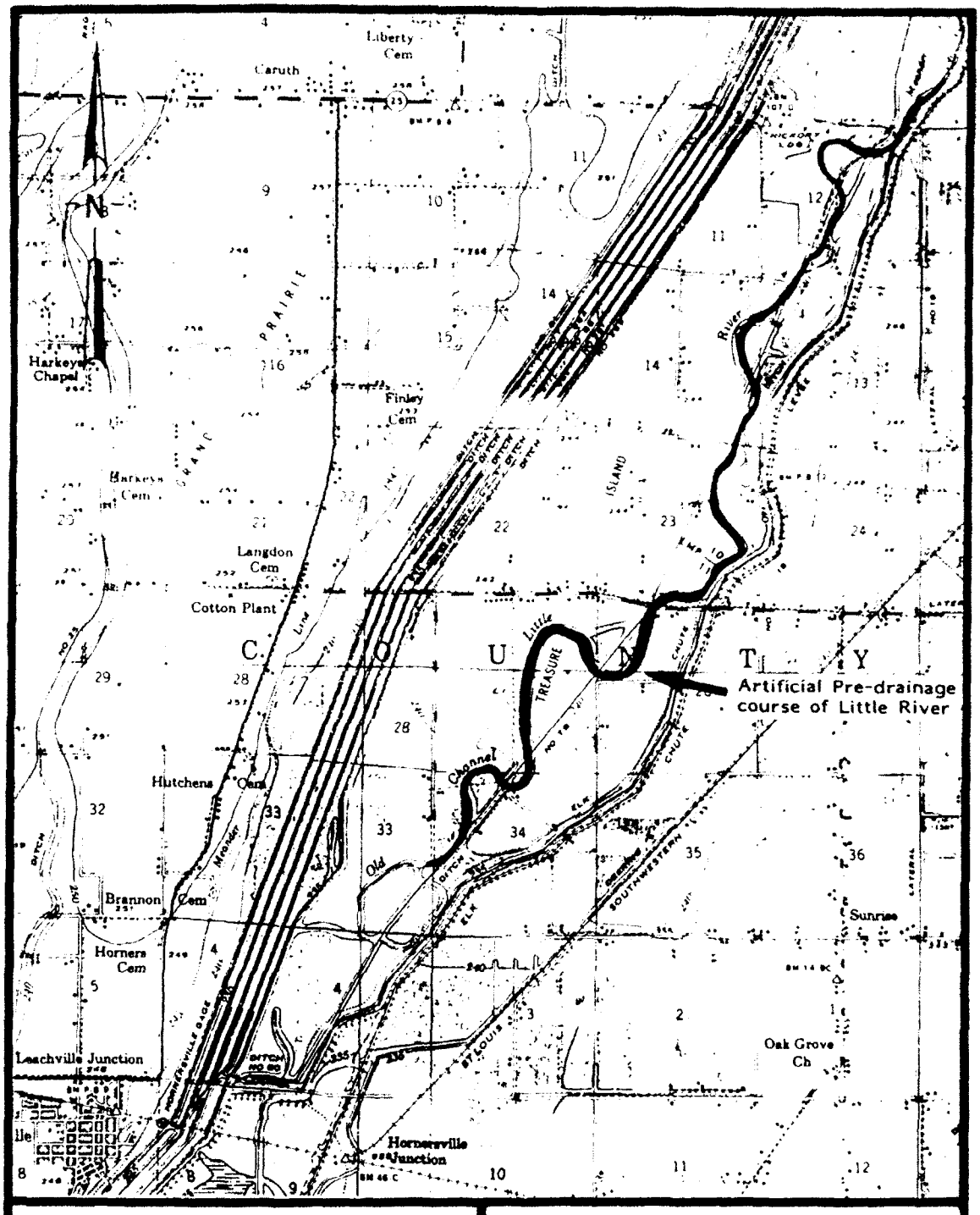


FIGURE 4. LOCATION OF THE LITTLE RIVER OLD COURSE.

adjacent floodplain, is nearly 300 km long ,and is 15 km wide over much of its northern half. It comprises a thin cap of silt loess on Pleistocene fluvial deposits (including gravel), which in turn cover Eocene claystones and siltstones.

Floodplain Processes, Stratigraphy and Sediments: Erosional features of a meander belt are only generally correlated with particular environments. A river-eroded cutbank can be formed only at a place the river can reach, such as its natural levee and point bar banks. A crevasse can develop across any low area in a levee crest, and continue down the distal slope and through the backswamp.

Depositional features (bars, point bars, natural levees, backswamp, and channel-fill surfaces) are associated with fairly well-defined environments of deposition and types of deposits. The varying fluvial processes and conditions which deposit a particular type of sediment mold characteristic surface forms on that deposit (Allen 1970; Reineck and Singh 1975). Sediments are geologically characterized and differentiated by statistical measurements of grain size and variations in composition, by internal stratification, and by other qualities. Detailed descriptions of the meandering Mississippi River processes and sediments are given by Fisk (1944) and Saucier (1964, 1968, 1970) among others. This section attempts only to describe briefly some of the major processes and depositional products of the study area.

Channel sediments of the meandering river are coarser than deposits of the natural levees and the backswamp, because they are products of the highest-energy environment. Even at low stage the river can move sand and fine gravel along portions of the channel. As the flow curves around a meander, particularly during high-water stages, the highest velocity/highest energy flow is directed at the outer bank. Material is eroded from this bank, especially downstream from the middle of the meander loop, leaving a cutbank.

Lower velocity flow and turbulence shuffles the products of erosion to the inner convex bank of the river, where an arcuate, gently-sloping bar develops. This "point bar" grows longer and higher during periods of several floods, until migration of the channel and/or other hydraulic causes initiate a new point bar, closer to the deepest part of the channel. The result is a series of arcuate ridges, low at the river edge, and separated by swales. This topography traces the migration of the meander. Deposits of active point bars include lenses of sand and silt. Once a point bar has been cut-off from the low-stage river by a new one, its growth is restricted to high-water stages, when additional layers of sand and silt are draped over the ridge crest. The swales tend to be swept clean of most sand and silt, and receive clay which settles out during waning floodstages. Swales can be closed at both ends by bars, resulting in pond environments.

As a meander migrates, deposition occurs further downstream than erosion. As a result, most point bar deposits are eventually recycled

and moved downstream, unless the meander is cut-off (a fairly common occurrence on the pre-1930 river). However, until and unless the point bar bank is eroded by the migratory river, high stage deposits build higher, the layers become more continuous, and ridge and swale topography becomes less pronounced. Eventually these upper point bar deposits can merge with and become natural levee crests.

Natural levees are the products of overbank deposition. As floodwaters rise and overtop the riverbanks, the energy available to transport sediment to the elevation of the bank top is reduced. Fine sand and silt are rapidly deposited, but the finer material (fine silt and clay) is carried further by the escaping floodwaters. Layers near the tops of natural levees tend to be relatively thin silts and clays, with some fine sands. The layers are continuous, and are sometimes traceable for several kilometers. When floodstage flow is concentrated in crevasse channels, fine sand can be carried and deposited down the levee flank and into the backswamp.

Deposits of the lower distal levee and the backswamp are silty clays and clay layers deposited during waning floodstages. Decaying and carbonized vegetation, roots, iron-enrichment, and rarely, invertebrate and vertebrate sub-fossils are all found in these sediments. Backswamp clays are very cohesive, and can inhibit meandering (as can "clay plugs" - clay fill in abandoned meanders; Fisk 1944; Kolb 1963).

Abandoned channels are initially partially stopped at one or both ends by sand bars. Subsequent deposition can isolate the cut-off portion, forming an oxbow lake. Clay deposits, overbank silts and sands, and vegetal debris gradually fill it in. Without active-channel aggradation, the abandoned channel and its natural levees gradually lose their definition because of compaction and encroachment of backswamp clays. Eventually the only trace of an abandoned channel at the floodplain surface might be an arcuate portion of a backswamp drainage stream.

Deposits below the braided surfaces "consist of the sediments that were laid down by rapidly shifting, aggrading streams during the earlier stages of valley aggradation" (Saucier 1964, Figure 3). Corps of Engineers core studies have found that the deposits to five to ten meters below the surface are clays and silts which overlie sands and gravels with clay and silt lenses. Saucier (1970:2849-2850) interprets these deposits as outwash from the waning stages (post-18,000 years ago) of late Wisconsinan glaciers:

> "Four distinct surfaces or terraces, each characterized by relict braided channel scars, are present on the outwash deposits....Eastward migration of the river (through diversions to new courses) accompanied by progressive downcutting or degradation, probably because of a decreasing sediment load and, hence, a greater stream competence, are believed to be the reasons for the formation of the terraces" (Saucier 1970:2849-2851).

He suggests that the Mississippi River could have changed from a braided to a meandering river some 6000 years ago (Saucier 1974:21).

Evaluation of Features of the Belle Fountain Survey Corridors

In this section, the various geomorphic features of the Belle Fountain survey corridors are treated by U.S.G.S. 15 minute quadrangle map designation. Present landforms, buried landforms, and apparent historic modifications are described.

Caruthersville Quadrangle (Figure 5)

The surveyed ditches lie entirely within the Mississippi River meander belt. Here, this meander belt has been continuously occupied since the river switched from its braided condition; many generations of abandoned channels could therefore be present at the surface, to depths of approximately 15 m below it. Saucier (1964, Caruthersville [a]) has mapped portions of several of these, and their locations were confirmed by analysis of maps, aerial photographs, and soil surveys in this study. No additional ones were detected. Portions of ditch L1-6 cross two buried natural levee crests, considered the most likely place for finding concentrated evidence of prehistoric human habitation. These are shown on Figure 5. Spoil banks along the ditches and degraded ditch slopes prohibited examination of the stratification of the levee crest areas.

Hayti Quadrangle (Figure 6)

East of approximately the crossing of the M6 Ditch and U.S. 61, the ditches lie within the marginal portion of the Mississippi River meander belt. Relict meander topography is very subdued, and there is no elevation change at the boundary of the braided surface to the west. The meander belt portion is dominated by a long abandoned course with two well-developed meanders. Ditches EM12, M6, BPS, and NF6 cross the very low, remnant levee crests of this course. Spoil banks and degraded ditch slopes again prevented examination of the stratification. Ditch M6 also crosses in several places the lightly buried natural levees of the Pemiscot Bayou relict crevasse course. An estimated minimum of one meter of dredge spoil is present along the surveyed corridor.

In the area of braided terrain, ditches M6, M9, and the Belle Fountain ditch do not cross any well-drained surface or buried drainages.

Kennet Quadrangle (Figure 7)

The Belle Fountain ditch crosses a flat portion of the braided surface. Extensive build up of dredge spoil was noted in the corridor.

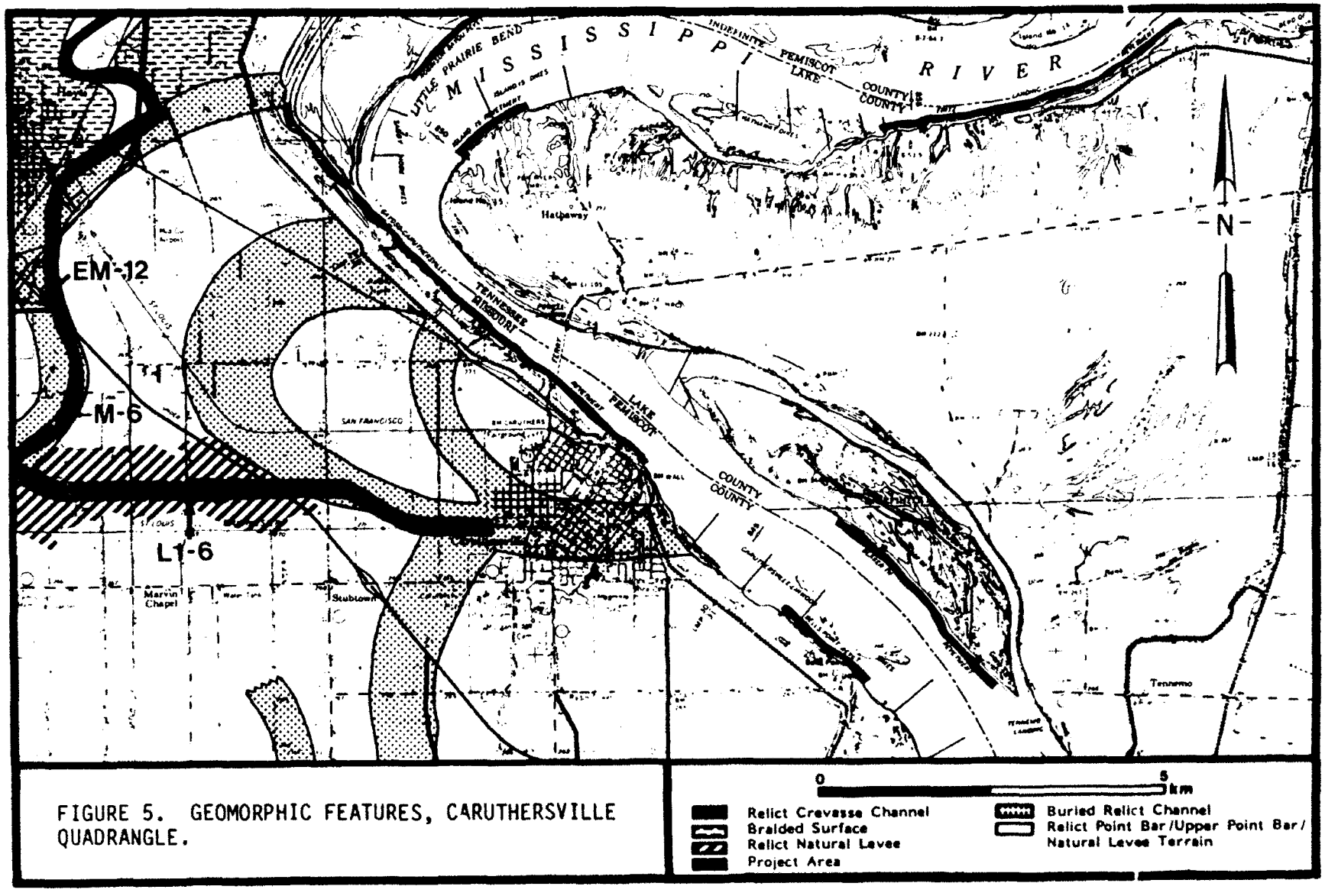


FIGURE 5. GEOMORPHIC FEATURES, CARUTHERSVILLE QUADRANGLE.

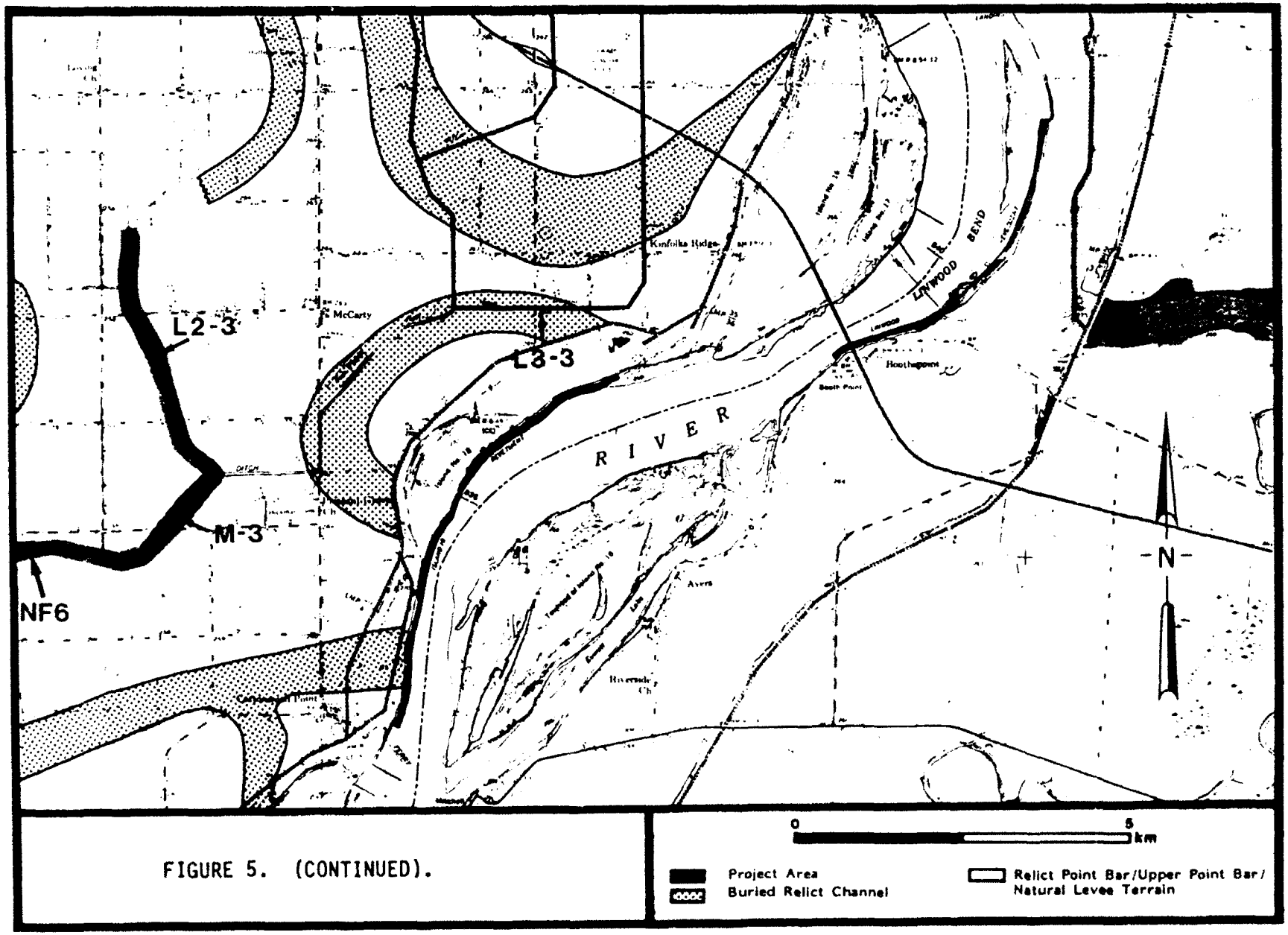


FIGURE 5. (CONTINUED).

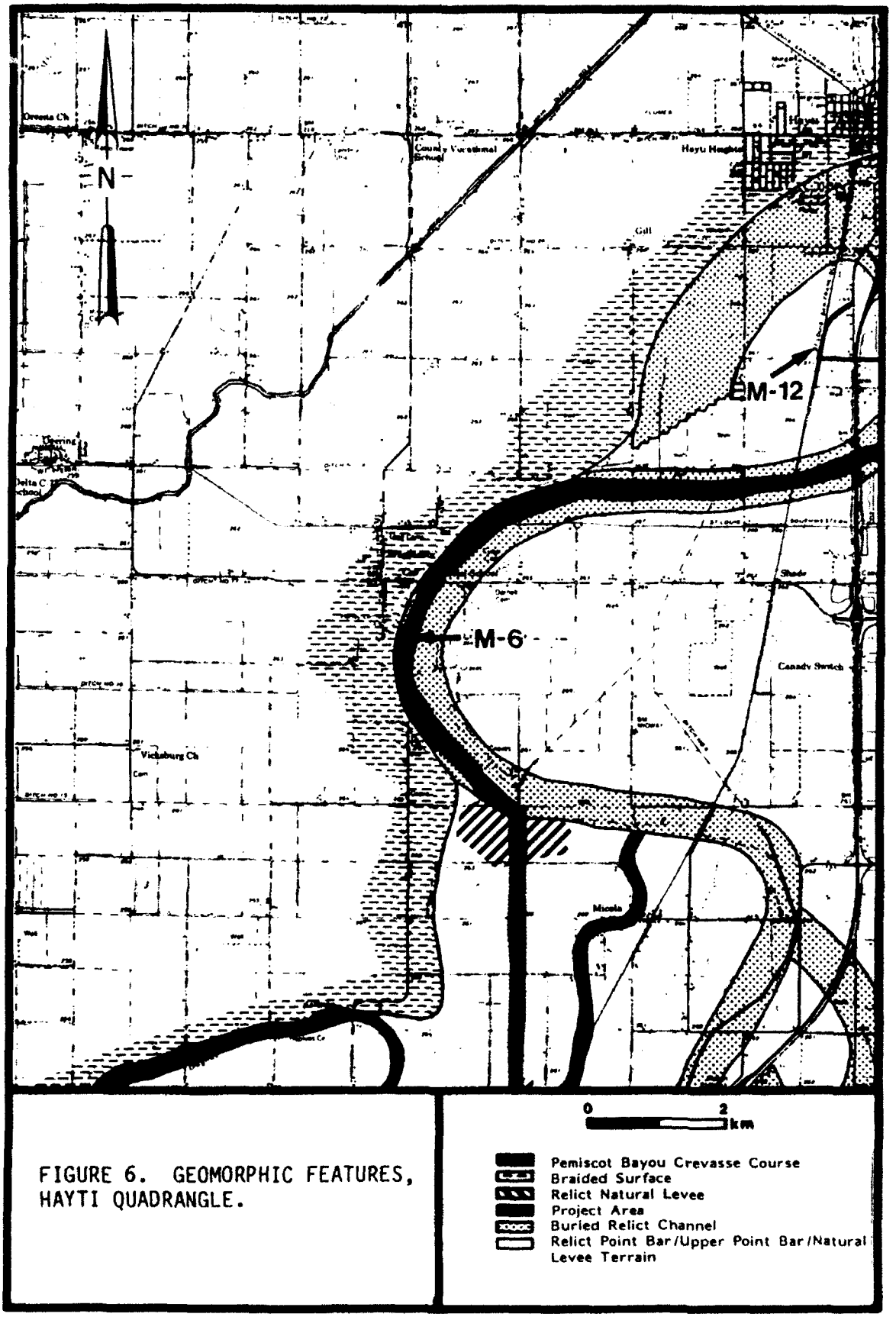
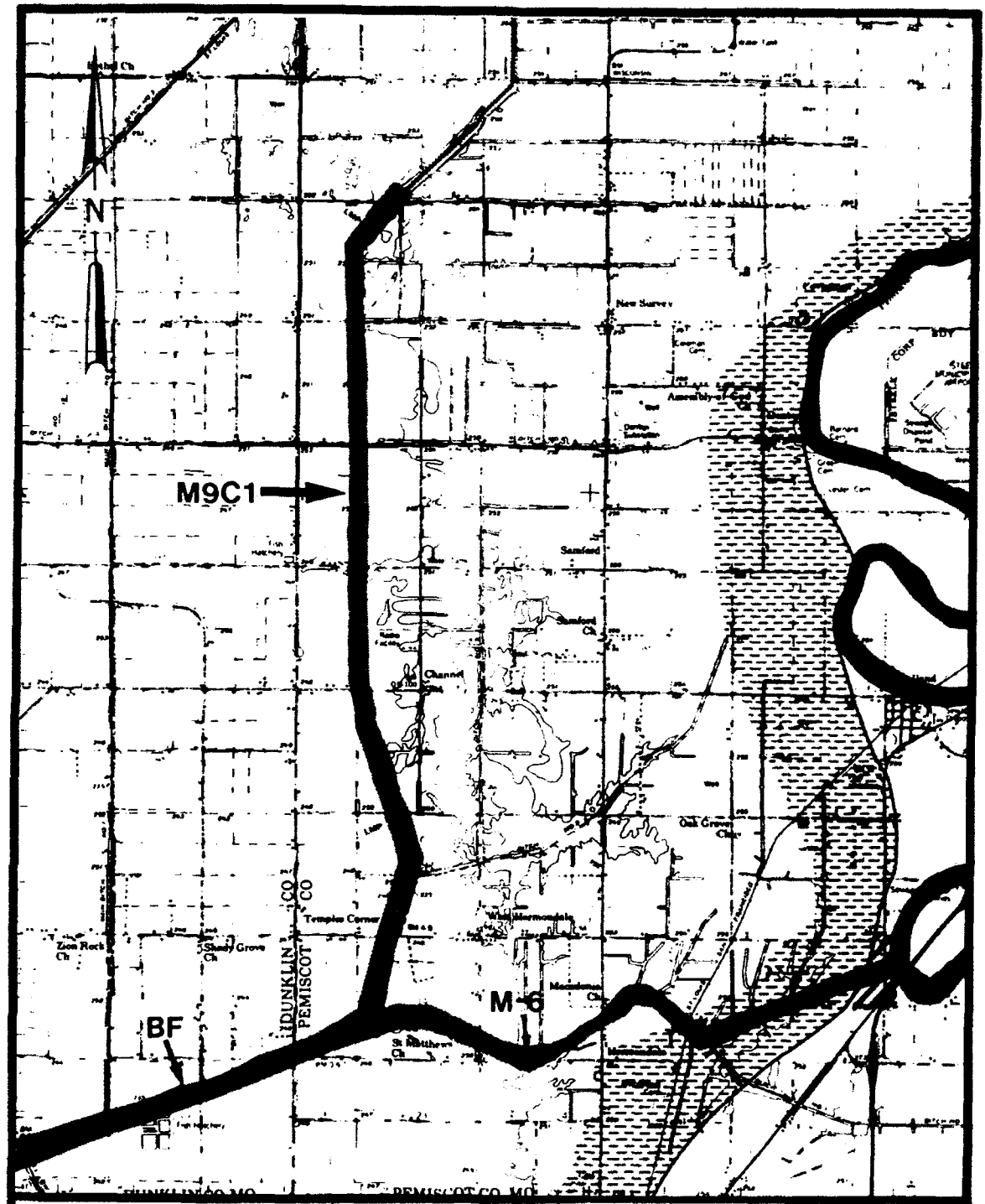


FIGURE 6. GEOMORPHIC FEATURES, HAYTI QUADRANGLE.



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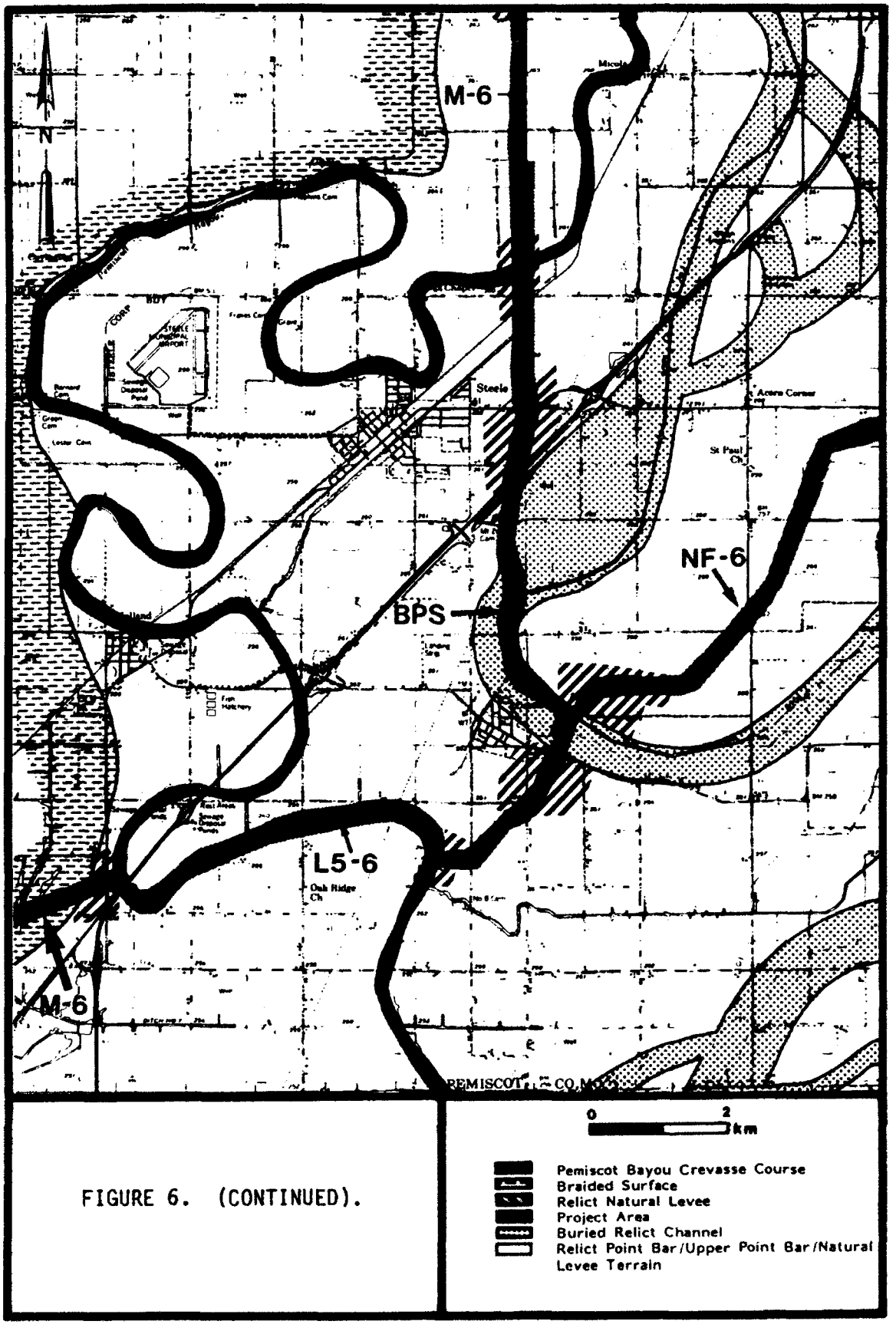

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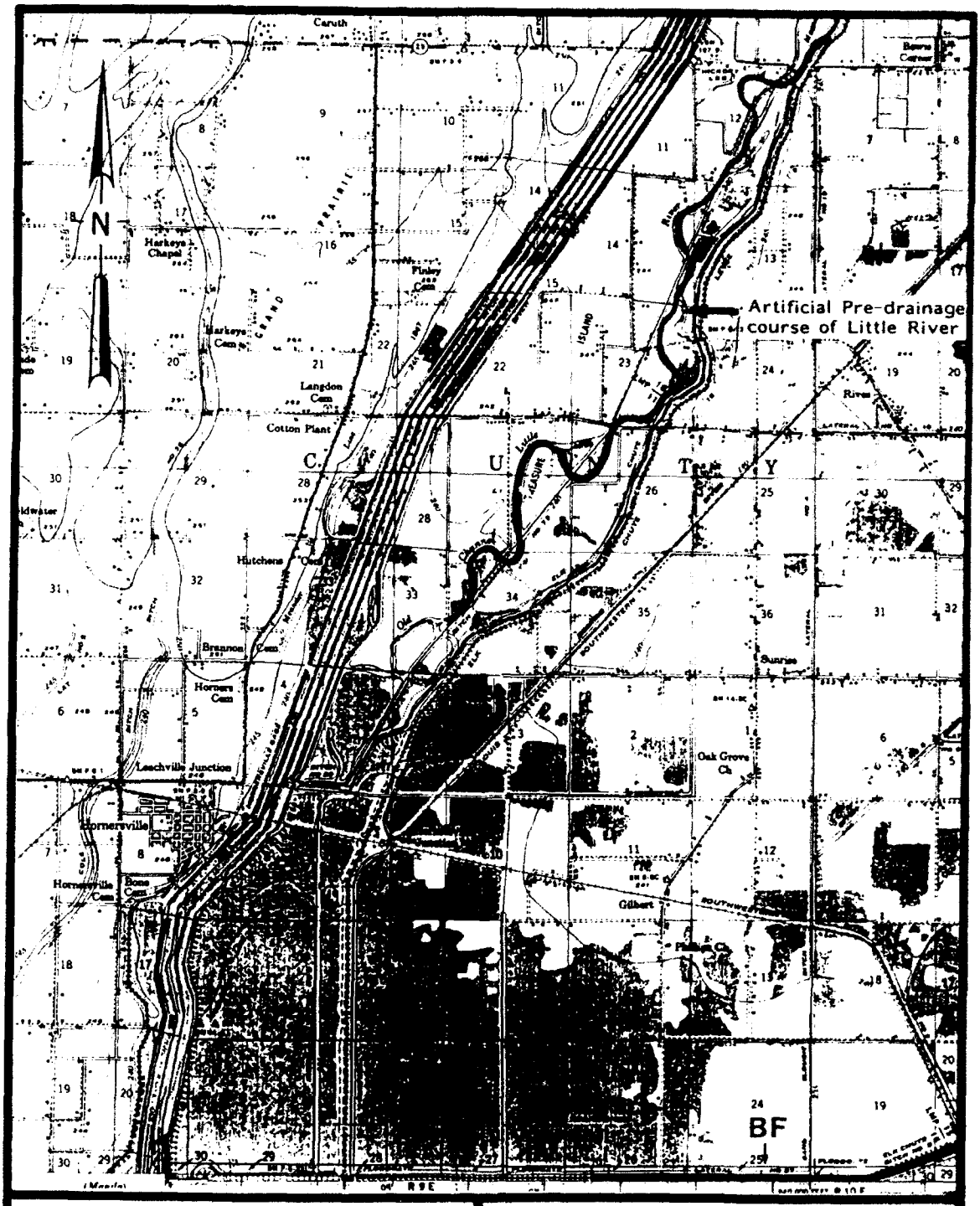

FIGURE 7. GEOMORPHIC FEATURES, KENNET QUADRANGLE.

Blytheville Quadrangle (Figure 8)

Ditch SL29 lies in the Pemiscot Bayou channel from Yarbro to a point north of the Blytheville Air Force Base main runway, where it crosses a buried natural levee of the crevasse course (definable only by soil patterns) into the flat, braided surface. Dredge spoil in the survey corridor obscures the stratification of the natural levee.

Manila Quadrangle (Figure 9)

The Belle Fountain ditch and the SL0 ditch are largely within the 1848 limits of Big Lake. In the northeastern corner of the Manila quadrangle the SL0 ditch crosses the flat braided surface. Only at Pettyville does the ditch cross a feature of detectable geomorphic significance: the buried natural levee of an abandoned channel of the Pemiscot Bayou crevasse course. Historic ditch spoil and the railroad line combine to prohibit any useful examination of the natural stratification.

Summary: Discussion of Belle Fountain Project Geomorphology

Geomorphic History

There is no question of the correctness of Saucier's sequence: the formation of successively lower terrace levels by the Mississippi River and a subsequent change in fluvial regime from braiding to meandering. There is unfortunately also no improvement possible to his chronology. Archaeological sites can provide only "no later than" information about the sequence of geomorphic events, unless they have been subjected to careful stratigraphic investigations, and are fortunate enough to have been located where evidence of some depositional or erosional event also occurred. The reversal of roles since Fisk (1944) established a geomorphically-defined absolute chronology, in part to aid archaeologists, is embarrassing to the geomorphologist. Neither the lithic scatter at site 23PM568 nor the prehistoric ceramic scatter at approximately mile 0.5 at Ditch L5-6 offered any useful chronological information. Consequently this report can only repeat Saucier's (1974) tentative chronology:

1) Braided surfaces were formed east of Crowley's Ridge from approximately 18,000 years ago to perhaps 6,000 years ago, during which time the Mississippi and Ohio rivers were separate for some undetermined distance south of Sikeston Ridge (approximately 125 km north of the study area).

2) A diversion of the Mississippi River to a new course which passed east of Sikeston Ridge possibly occurred about 6,000 years ago. From that time the two rivers have been joined south of Cairo, Illinois, and the meander belt has remained on the eastern side of the alluvial valley. In the study area, as many as 15 m of meander belt natural levee and point bar depcsits have accumulated, and backswamp

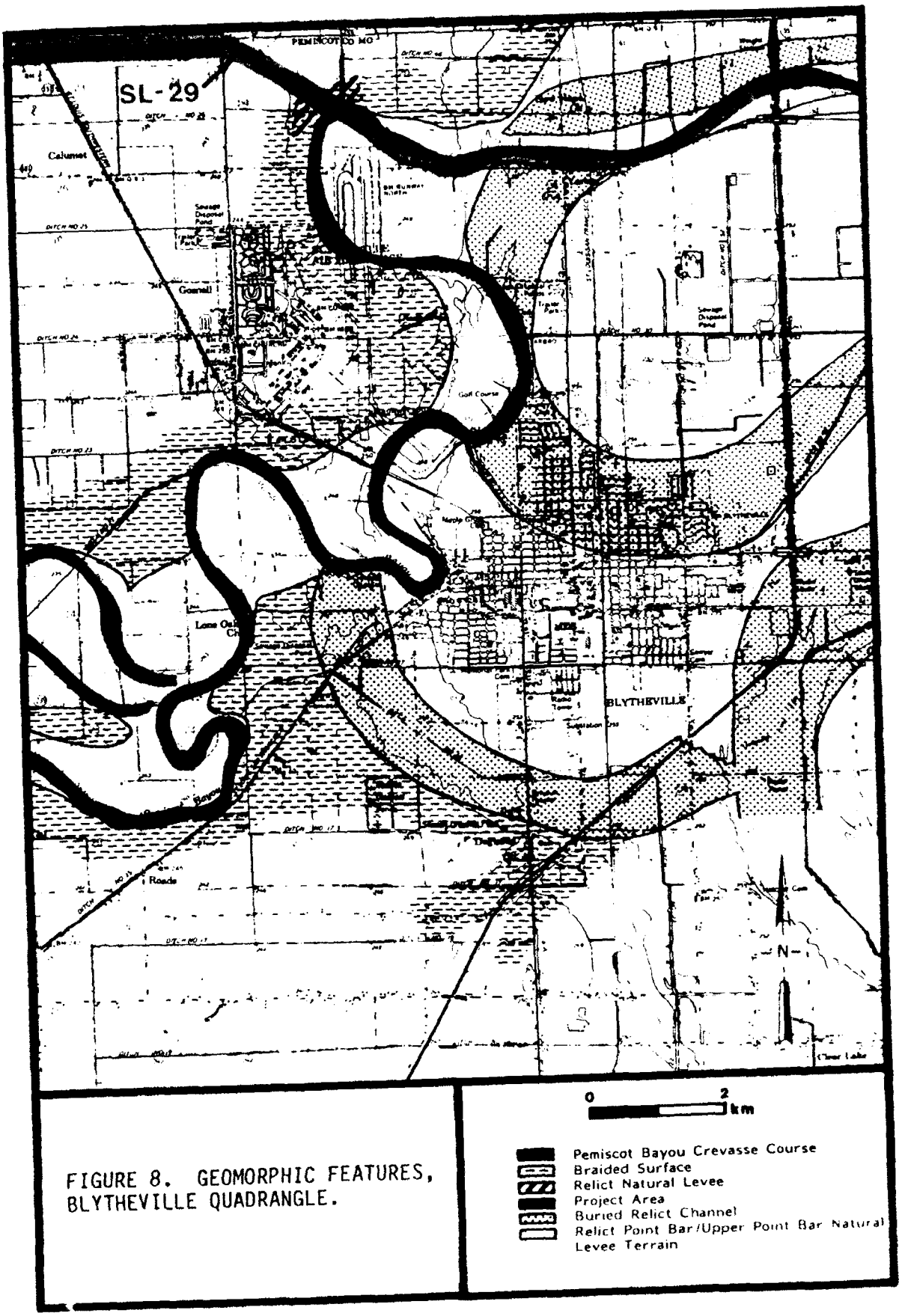

FIGURE 8. GEOMORPHIC FEATURES, BLYTHEVILLE QUADRANGLE.

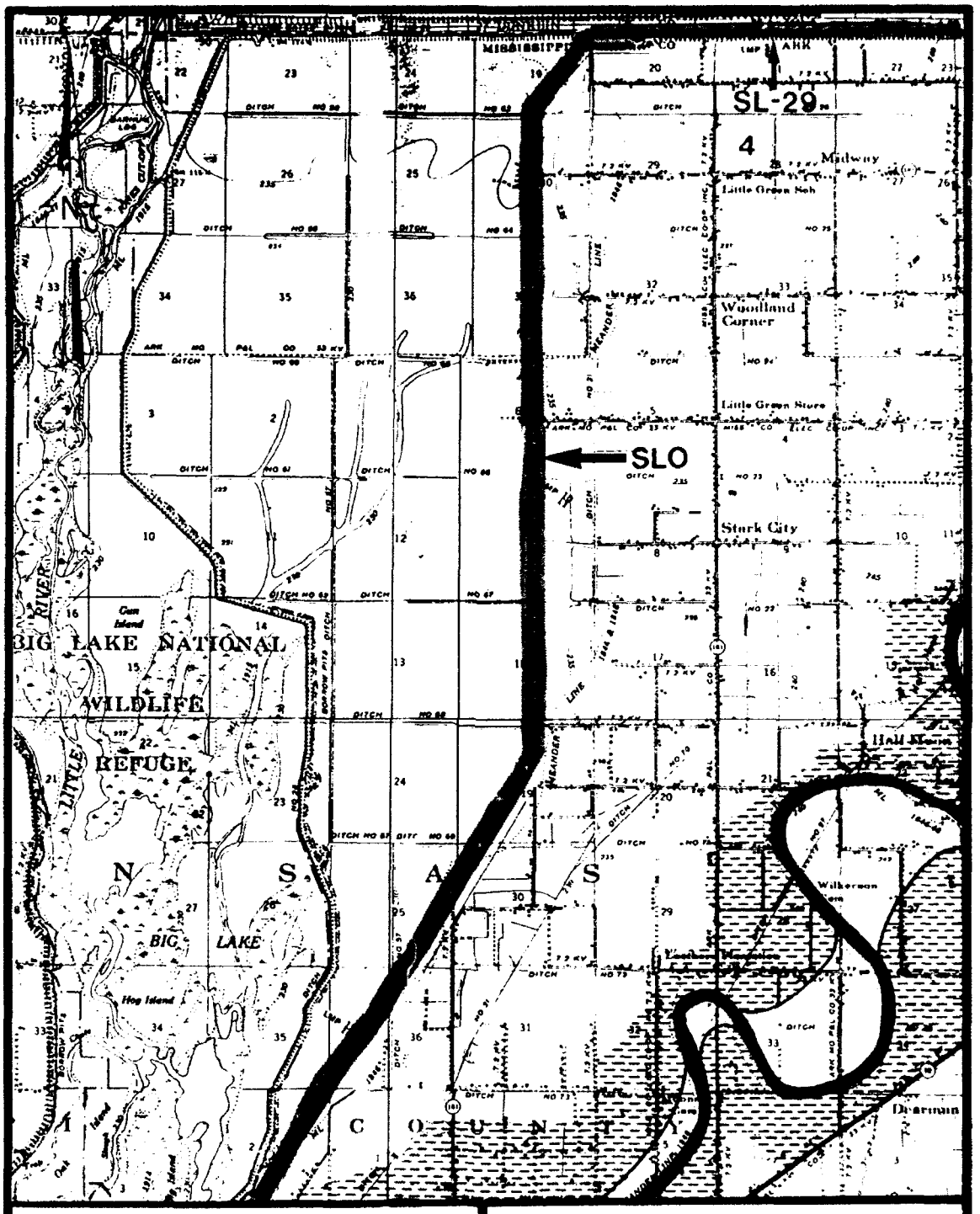

FIGURE 9. GEOMORPHIC FEATURES, MANILA QUADRANGLE.

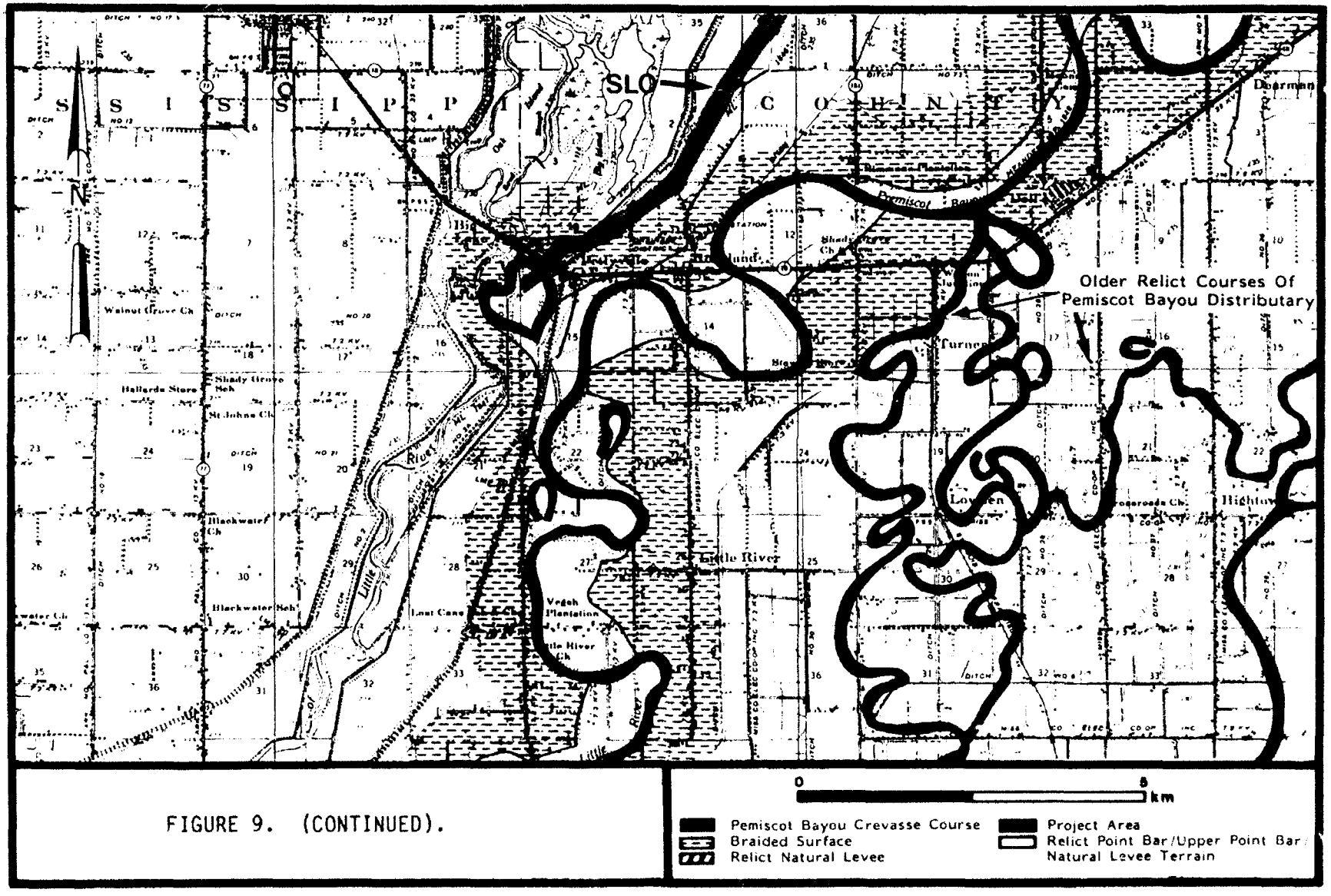

FIGURE 9. (CONTINUED).

deposits have formed a thin coating (probably less than one meter thick over rises, thicker in the channels) over the braided level D surface.

3) At around 1,000 to 1,500 years ago, the crevasse channel now represented by Pemiscot Bayou and the Left Hand Chute of the Little River developed. It persisted long enough to build natural levees which ponded not only Big Lake, but the much more extensive "sunk lands" of the St. Francis River drainage above Marked Tree, Arkansas.

The few detectable cross-cutting relationships indicate that the crevasse channel was probably the latest feature to develop on the western side of the meander belt. Abandonment of the Mississippi River course noted in the Hayti quadrangle, by a shift to a new course to the east, probably lead to much less flow in the crevasse channel, and its reduction from a distributary to a backswamp drainage stream. No estimate of the time or duration of flow is possible for any of the abandoned channels and courses in the area.

Potential for Locating Sites on Buried Relict Landforms

Locating the Landforms: Buried landforms can be detected using the proper tools, and their presence can be confirmed by trenching and coring (Fisk 1944; Saucier 1964; Lenzer 1979). The meander belt natural levees and channels, and the braided ridges and swales of the Belle Fountain project area are buried under at least one meter of backswamp clay (generally Sharkey soil association) according to elevation data.

Locating Sites: Analyses of the locations of archaeological sites on unburied landforms particularly natural levee crests, and the successful extrapolation of these data to predictive site location models (Thomas et al. 1982), are good arguments that archaeological sites, modified to unknown extents by soil processes, should be present, and might be detectable at least on the crests of buried natural levees. The discoveries of lithic and ceramic scatters in deeply plowed fields on relatively thinly covered buried natural levees confirms the presence of sites in some form.

The problem in the study area was not to compute the amount of earth that would have to be moved, the number of cores that would have to be taken at what spacing, in order to discover a site of a certain size. Rather, in the Belle Fountain area, the geomorphic aspect of the problem of finding buried sites reduces to the location and width of the survey corridors. Reviewing the geomorphic interpretation presented above produces the following list of natural levee crests crossed by the survey corridors:

Caruthersville Quadrangle: One (L1-6 crosses a buried natural levee at approximately Patterson Cemetery; width of corridor 200 ft; no subsurface testing was done, in accordance with the landowner's wishes).

Hayti Quadrangle: Seven (EM12 lies on two overlapping natural levees; natural stratification obscured or obliterated by road and railroad construction. M-6 northwest of Micola crosses the buried natural levee of a Mississippi River course; corridor width is 250 ft. Bypass Steele southeast of Steele crosses the natural levees of the same course; corridor width is 310 ft (94.4 m) to 460 ft (140.2 m); it is the longest association of corridor with buried natural levee crest, as the two cross at an angle of approximately 30 degrees, for a distance of nearly one kilometer; site 23PM568 was found in this section. Ditch 5 makes a third crossing of the natural levee of this course; the crossing is normal to the course corridor width is 300 ft (91.4 m). Ditch NF6, the course east of Cooter, also approximately normal to the crest, which is slightly higher than the backswamp to the northeast. L5-6 crosses the slightly buried natural levee of the Pemiscot Bayou crevasse channel at right angles, southwest of Cooter; the prehistoric ceramic scatter found outside the corridor appears to be associated with the natural levee of this distributary course. M-6 crosses the natural levee of this course at right angles at its intersection with US Highway 51; the buried crest probably lies below the highway.)

Kennett Quadrangle: None

Blytheville Quadrangle: One (SL29 at mile 6.5 crosses the buried, narrow natural levee of the Pemiscot Bayou crevasse course, north of Blytheville AFB; the crossing is nearly at right angles; corridor width is 100 ft).

Manila Quadrangle: One (SL0 ditch crosses a barely exposed natural levee of the crevasse course west of Pettyville, at right angles; corridor width is a maximum 400 ft [122 m]).

Even without statistical interpretations, the limited associations of survey corridors and buried natural levee crests, the one prehistoric lithic scatter (and other prehistoric sites known to lie outside the surveyed areas), and the amount of disturbance and spoil cover, all argue that the paucity of prehistoric sites in the project area is a function of historic and methodologic causes, rather than the result of either geomorphic, environmental, or human preference causes.

SOILS

While soils vary throughout the project area there are some basic similarities. Most of these similarities derive from development in backswamp or slack water areas. The exceptions to this general statement are the relatively short segments of ditch along the Pemiscot

Bayou system and such other portions of natural levees as the ditch crosses.

Price and Price (1980) have noted that certain soil types, especially the better drained loamy types, have a higher probability for cultural resources.

> "In Pemiscot County, Crevasse loamy sand should receive the highest priority...as it is known to have high site density associated with it. Tiptonville silt loam, Dubbs silt loam, Commerce silt loam, Wardell silt loam and Dundee silt loam are also known to have greater proportions of archaeological sites correlated with them" (Price and Price 1980:46).

Morse (1975) even sees Dundee soils as a good indicator for prehistoric farming sites, especially those of his Big Lake Phase.

In the project area soils of the prerequisite and similar types do occur. However, the occurrences are scattered, for the most part are associated with the natural drainages already noted, and make up less than five percent of the total area involved. Such occurrences did receive special attention during survey.

In the main, the soils of the project area are heavy, generally poorly drained soils. They are commonly clayey in their lower parts (Ferguson and Gray 1971) and frequently associated with slack water or backswamp conditions (Brown 1971). As such the majority of the soils in the area are not regarded as having high cultural resource potentials.

FLORA AND FAUNA

As noted previously our understanding of vegetational trends is not as perfect as we might wish. However, we can be reasonably certain that for the last 1,500 years or so the vegetation of the project area was similar to that which was present in the late 19th century. The records of that time period and of the plant successionists (Shelford 1963) indicate a vegetational regime which probably resembled the present day Big Lake National Wildlife Refuge (Figures 10 and 11).

This is what Kuchler (1964) has labeled Southern Floodplain Forest. It is a dense medium tall to tall forest of broadleaf deciduous trees. Dominants include tupelo (Nyssa aquatica), various species of oak (Quercus spp.) and bald cypress (Taxodium distichum). In this ecosystem, water, and vast quantities of it, is the controlling factor and flooding is an important annual event. Shelford (1963:94) indicates that "in times of flood, before the present levees were installed, one could cross the entire area (between the Mississippi and Crowley's Ridge) in a rowboat."

FIGURE 10. STATE LINE OUTLET DITCH VIEW WEST FROM BANQUETTE LEVEE ACROSS SLO DITCH TO BIG LAKE NATIONAL WILDLIFE REFUGE AREA.

FIGURE 11. STATE LINE OUTLET DITCH WEST BANK LEVEE SHOWING SLO DITCH LEVEE AND BIG LAKE NATIONAL WILDLIFE REFUGE. View south at mile 6.8.

Thus, there are two types of terrestrial habitats. The first lies close to the river channel and is characterized by a short annual submergence. The second type, and the one we are most concerned with, is a long submergence type associated with backswamp outside the active meander belt. This is a climax forest, which in Shelford's study area was primarily tulip-oak dominated. However, the lower elevations of the drainage of the Little River are characterized by Shelford, following Putnam, as principally dominated by sweetgum, oaks, elm, sugarberry, ash and along streams, cypress (Shelford 1963:104). In either case the important implication for human subsistence is that this was a very rich if moist environment. Potential subsistence materials present include not only hardwood mast (Keller 1974) but also the animal species supported by that same resource.

Prior to the obliteration of the climax forest, the area supported a complex faunal assemblage. Some of these species such as raccoon, opossum, muskrat, beaver, rabbit and squirrel are still present in the area. The large mammal species such as deer, elk, bear, wolf, cougar and bobcat have been extirpated or nearly so (Shelford 1963:104). There is a high probability that the area was seasonally blanketed with waterfowl and the presence of large populations of other birds, reptiles, fish and amphibians (Shelford 1963:106).

Morse (1973b:77) has suggested that prehistoric populations in this area would be utilizing the quite separate microenvironments that existed within the overall ecosystem. While Morse's primary concern is with the political systems that might develop in relation to exploitation needs of the society, the concept of microenvironments is an important feature in understanding settlement trends and ecological patterning. It is also one, unfortunately, for which data is severely lacking since refugium like Big Lake are likely to represent special cases. As a result, any understanding of the project environment and its effect on human settlement is likely to be limited to the special ecological situation represented by areas that are either permanently flooded or poorly drained. We would suspect that such areas would attract sporadic special activity occupations but not large scale settlement. If this perceived trend is correct only small diffuse archaeological sites should be present. Except in special conditions, where higher and better drained situations produce local variation, this appears to be the case.

SUMMARY

The preceding discussion has been aimed at providing a description of the environmental context in which the Belle Fountain project area is set. The importance of environmental factors to human settlement are apparent. Particularly in light of the results of this project, these factors must be evaluated more thoroughly. As such, we have integrated additional environmental data into our interpretations of the cultural sensitivity in the project area in Chapter Six.

CHAPTER THREE

PREVIOUS INVESTIGATIONS

The Lower Mississippi Alluvial Valley has attracted the attention of archaeologists and antiquarians for well over a century. The first evidence of this can be seen in Squier and Davis' Ancient Monuments of the Mississippi Valley (1848). While their first work was geared toward gaining an understanding of mound building and its origins, this early investigation did indicate the potential of the area for prehistoric research. Squier and Davis mapped some sites, excavated at others, and made specific mention was made of mounds in the Missouri Bootheel (Morse 1980; Willey and Sabloff 1974).

After Squier and Davis, the general vicinity of the project area was visited by the great collector/excavators of the late 19th and early 20th centuries, Cyrus Thomas (1894) and C. B. Moore (1916). The narratives of Thomas and Moore are well known and heavily cited in the archaeological literature. For this reason, we shall not dwell on their works beyond noting that they perpetuated an emphasis on the investigation of mounds and sites exhibiting the more spectacular artifact arrays.

The area began to attract the attention of scientifically trained archaeologists in the late 1930s and early 1940s when Dr. Phillip Phillips, Dr. James Ford and Dr. James B. Griffin undertook an archaeological survey of the Lower Mississippi Alluvial Valley. Phillips, Ford and Griffin and their assistants mapped, surface collected and made stratigraphic excavations at a number of sites in both Pemiscot County, Missouri, and especially Mississippi County, Arkansas (Phillips et al. 1951).

By this time investigators had begun to establish a broad regional chronological sequence. Stephen Williams, who continued to work in the general vicinity of the project area, developed and refined this chronology as he examined local collections and continued the process begun by the Lower Mississippi Alluvial Valley Survey. These data formed the basis for his dissertation (1954), in which he presented sequences for the Little River Lowland applicable to the current study. Williams defined five separate phases. These are, from earliest to latest: Pascola, Hoecake, Black Bayou, Pemiscot Bayou and Nodena (Williams 1954).

Since Williams' sequence was published it has undergone a series of redefinitions and modifications as additional data has been accumulated (Hopgood 1969:69; Price et al. 1978; Morse 1980). Land leveling in the 1960s and 1970s attracted the attention of investigators in both Missouri (R. J. Williams 1968, 1972) and Arkansas (Medford 1972). These studies and the associated salvage operations produced significant data as well as underscored the serious threat of land moving to archaeological sites.

Mention should also be made of the salvage excavations carried out by the University of Missouri in the path of Interstate 55 (Marshall 1965). At the Kersey site for example, more than 9,000 artifacts, in addition to burials, postmolds, trash pits, and a charnel house were identified and investigated thoroughly. Marshall (1965) identified two major occupations at this site, Baytown and Mississippian.

In 1968, R.J. Williams conducted investigations at the Denton Mounds, 23PM549, and in the face of land leveling operations recovered significant data (R.J. Williams 1972). This site, now on the National Register, is located on Pemiscot Bayou just north of the project area. Williams identified a single component late Mississippian Nodena phase component at the Denton Mound.

Even earlier, in 1955, the University of Missouri had conducted investigations at the Campbell Site near Cooter and just outside the project area. This too proved to be a primarily late Mississippian component (Chapman and Anderson 1955). This site is also on the National Register of Historic Places.

In Arkansas, Redfield (1973) and later Goodyear (1974) and Morse (1973a, 1975) had concentrated efforts on the clarification of the early Dalton culture. Most Dalton culture sites appear to be concentrated outside the immediate project area (Redfield 1973). Morse (1977a) feels that a series of bands held territories associated with particular drainages in the lowlands. If the latter supposition was true, we felt that cultural resources would theoretically occur in the restricted areas where the current project crosses braided stream terraces.

Morse (personal communication) sees the project area as crucial to understanding the relationships existing between the Barnes and

Baytown ceramic groups during the Late Woodland period. Morse (1977b) sees Barnes with its sand tempered ceramics as a northern intrusion while Baytown with its grog tempered wares is primarily a southern expression. Morse (1980) has also expended considerable effort on later Mississippian developments in Arkansas. The immediate project area, however, seems to have attracted little attention.

More recently archaeologists have conducted a number of survey or reconnaissance level investigations in or adjacent to the project area. These have contributed to our overall understanding of man-land relationships and resulted in a number of predictive models. Particularly noteworthy are the series of projects undertaken in connection with a proposed Missouri and Arkansas Power Corporation transmission line through New Madrid, Pemiscot and Dunklin counties, Missouri and Mississippi County, Arkansas. A major literature search and archival review (Price et al. 1978) and field survey (Trubowitz 1979) have produced a model which indicates that certain soil types have a higher potential for archaeological sites than do others (Price and Price 1980).

Finally, and more to the point, Iroquois Research Institute, Inc. undertook a reconnaissance level survey of the Belle Fountain Ditch and Tributaries project for the Corps of Engineers (LeeDecker et al. 1978c). The area to be impacted was first stratified according to the geologic and physiographic criteria previously established for predictive modeling within the St. Francis River Basin (LeeDecker et al. 1978a, 1978b) and a random stratified sample of the entire area was selected.

Field investigations, limited to surface collection and shovel tests, were carried out within the selected sample areas. These sampling locations included such high cultural resource probability areas as abandoned channels, point bars and undifferentiated braided stream terraces. The Iroquois survey recorded 24 sites, only one of which was prehistoric. One other site may have been utilized in the 19th century but the remaining 22 all represented relatively modern standing structures or their remains (LeeDecker et al. 1978c).

Similar, if less directly applicable surveys, have been made throughout the Bootheel region of Missouri and adjacent Arkansas. Of particular relevance are reports on the Caruthersville Harbor Project (LeeDecker, 1980b), on the Ditch 81 Control Structure Repairs Project (LeeDecker et al. 1979b) and on the Ditch 27 and Tributaries Channel Enlargement Project (LeeDecker et al. 1978b). All these reports are primarily locational in nature and the varying degrees of success reported are a guide to the cultural resource potentials of various microenvironmental zones.

CHAPTER FOUR

CULTURE HISTORY

The prehistory of the project area and its surrounding region, the Lower Mississippi Alluvial Valley, are best subsumed under a theoretical framework consisting of a series of cultural stages or periods. In the project area these are: Paleo-Indian (ca. 11,000 B.C. to 8500 B.C.), Dalton (ca. 8500 B.C. to 7000 B.C.), Archaic (ca. 7000 B.C. to 500 B.C.), Woodland (ca. 500 B.C. to A.D. 800), and Mississippian (ca. A.D. 800 to historic contact). These major stages have also been subdivided (Williams 1954, Hopgood 1969) and discussed in detail by Morse (1980) and Price et al. (1978).

Following is a brief discussion of the culture history applicable to the project area. The discussion is oriented toward a summary of cultural stages or periods with attention to issues where warranted.

SEQUENCE SUMMARY

Paleo-Indian Stage

Although earlier occupations may be possible, the first clearly documented human use of the study area began around 10,000 B.C. At this time, the combined Mississippi and Ohio Rivers flowed in a braided channel just east of Crowley's Ridge. The plant community may have been either a deciduous forest or a more open, park-like savanna. Paleo-Indian remains in the area are most commonly found along rivers, with a definite clustering effect; Morse (1975) has suggested that these clusters represent individual hunting bands.

Paleo-Indian subsistence can be seen as fairly generalized, in the sense that it relied heavily on whatever large game was available, rather than on a carefully articulated exploitation of localized resources. Animals available for hunting included deer, elk, horse, mastodon, and tapir; with the continuing biotic changes of the early Holocene many such forms disappeared, no doubt contributing to the end of this cultural stage.

Major research topics for the Paleo-Indian period include delineation of variability in fluted point technology in terms of raw material, manufacture, and morphology, as well as relating the regional fluted point tradition to other traditions such as Folsom and Clovis.

Archaic Stage (8,000-500 B.C.)

The terminal Paleo-Indian to early Archaic transition is a major issue in this area because of work carried out by Morse (1973a, 1977a) on the Dalton culture. Although Morse (1973a, 1977a), Schiffer (1975), and others (Morse and Goodyear 1973) have considered the nature of the Dalton culture, there is still some question as to the identification of the differences between the Dalton artifactual complex and the "true" Paleo-Indian complexes. Perhaps of equal importance is the relationship of Dalton to subsequent Archaic cultures. Here, we will follow Goodyear's (1974) suggestion that seen in terms of adaptive strategies, the Dalton culture should be considered as Early Archaic rather than as Paleo-Indian.

Early Archaic occupation of the general area appears to have been fairly heavy (e.g., House and Schiffer 1975). One interpretation of such remains, for the L'Anguille Basin (Morse 1971; Goodyear 1974), is that a pattern of base camps and their corresponding hunting, butchering, and food gathering camps can be discerned. There is, however, some controversy over the nature of Dalton settlements. Morse (1977) suggested that these consisted of a series of cooperative bands occupying major watersheds. Alternatively, Schiffer (1975) hypothesizes that it was an individual band settlement oriented east-west.

There is almost no evidence for Middle Archaic occupation of the general study area. Various explanations for this fact have been suggested, including unfavorable environmental conditions (Morse 1977a) and the inability to distinguish such components from later ones. However, Middle Archaic occupations have been documented in nearby areas (such as the Ozarks), and the the study area may simply have been an occupied zone between such populations.

The Late Archaic can be divided into the Frierson and O'Bryan Ridge phases. The latter is of interest because of its contemporaneity with the Poverty Point culture. Identified from investigations at the type site, Poverty Point in northeast Louisiana, the culture is marked by earthwork construction, the production of baked clay items (Poverty Point objects), a well-developed lapidary

technology, and the use of exotic raw materials (Webb 1977). These artifactual attributes in combination with the earthwork construction has led investigators to suggest that the culture included a stratified political structure, in which an elite scheduled subsistence activities and regulated an extensive trade network throughout various portions of the Southeast (Gibson 1974; Webb 1977).

Investigations in the peripheries of the type site (Thomas and Campbell 1980) have somewhat modified these suggestions by hypothesizing that populations surrounding the site were seasonal, scheduled to coincide with a gathering of Poverty Point peoples from regional centers. On the basis of the data, they suggested a late summer-fall/early winter occupation in the peripheries. Although they did not dismiss the notion that the type site may have been occupied year-round, the investigators suggested that population may have been greatly reduced to only the elite or the elite and specialized craftsmen. Both hypotheses of Poverty Point settlement await confirmation by future data.

Throughout the Mississippi Valley, a number of regional centers have been identified with surrounding support populations (Webb 1977). Since Poverty Point is believed to be the cultural center, those centers and sites closest to the type site tend to replicate the artifactual inventory and material characteristics found there. However, expressions of the period, if not the culture, are found elsewhere and one of these expressions is in the present project area. Designated the O'Bryan Ridge phase of the Poverty Point period (Phillips 1970), it is the northernmost expression of this Late Archaic development. O'Bryan Ridge sites are characterized by the presence of baked clay objects, most of which are termed amorphous or lumpy (Phillips 1970); however, biconical and spheroidal forms are also found at O'Bryan Ridge phase sites and, less frequently, even biconical extruded examples.

Woodland Stage

The traditional hallmarks of the Archaic-Woodland transition are pottery and agriculture. The latter, however, does not seem to have been very important until late in Woodland development.

Early Woodland occupation seems to have been rare in the general study area, although this may reflect difficulties in identifying such remains. Diagnostic items, such as they are, include Cormorant Cord Impressed and Alexander-like pottery. In the Little River area, Williams (1954) defined the Pascola phase as the local counterpart to the Burkett phase of the Cairo Lowland area. However, as Phillips (1970) noted, the phase is otherwise not well defined.

In the Middle Woodland (Marksville period), the study area was part of the "Hopewell Interaction Sphere," as seen in the presence of Hopewellian-related pottery and other such markers (Caldwell 1964; Streuver 1964). However, only one site in the general area appears to have been a locus of elaborate Hopewell ceremonialism. This is the Helena Crossing site (Ford 1963), in Phillips County, Arkansas.

In the Late Woodland (Baytown period), trade and ceremonialism do not seem as highly developed as earlier. The population, while growing, was still dispersed (Schiffer and House 1975:32). One interpretation of this period is that as agriculture increased in importance, there was correspondingly less emphasis on traditional redistributive networks for wild foods. It is interesting that for this period, there are no region-wide cultural markers for the lower Mississippi Valley (Phillips 1970:901).

The Baytown period occupation in the area can be divided into two phases. The Hoecake phase is characterized by Mulberry Creek Cordmarked and Baytown Plain pottery; other potential ceramic components at sites include Larto Red, Withers Fabric Marked, Barnes Plain, and Barnes Cordmarked. The Dunklin phase has a similar ceramic content, except that Barnes Plain and Barnes Cordmarked take the place of Baytown Plain and Mulberry Cordmarked as the dominant types (Phillips 1970). The cultural significance of this distinction (in large part, a distinction between sand and grog temper) is unclear; however, it does not seem to reflect environmental factors--each phase occupies similar environmental zones.

Morse (1977b) has examined the Baytown and Barnes traditions from a standpoint of different tribal organizations, but much remains to be understood about both the geographic distribution of the Baytown period tradition and the cultural dynamics of each.

For example, research themes raised in the Arkansas study plan (Davis 1982) reflect a need for information on Baytown and Barnes settlement systems, the temporal and geographic relationships of Baytown and Barnes and whether migration from Missouri gave rise to the Barnes tradition. A clearer understanding of Barnes and Baytown traditions is critical to interpretations of the Mississippian tradition in northeast Arkansas.

For the Coles Creek period, Phillips (1970) has defined the Black Bayou phase in the general study area; he distinguishes this phase on the appearance of Wheeler Check Stamped pottery. The phase, however, remains ill-defined.

Mississippian Stage

The hallmarks of this stage are an intensified reliance on agriculture and the appearance of a stratified political order. More prosaically, sites of this period can be distinguished by their shell tempered pottery. In the general study area, the Mississippian may have resulted from both migration and cultural contact. The Big Lake phase (in Mississippi County, Arkansas, and Dunklin County, Missouri) may represent an influx of peoples into the area from the Cahokia or Cairo Lowland areas, at about A.D. 1000. Thereafter, previous residents went through a more gradual process of acculturation into the complex, as seen in the example of traditional vessel forms prepared with shell tempered paste (Schiffer and House 1975).

Middle Mississippian sites are widely evident by A.D. 1200; diagnostic traits include Scallorn-type points and a predominance of undecorated shell-tempered pottery. In the general study area, the characteristic settlement pattern is of villages oriented around temple/plaza complexes.

From about A.D. 1400 until the arrival of Europeans, increased fortification and centralization of authority can be noted. With the arrival of de Soto in the region in 1541, the prehistoric period draws to a close. Thereafter, European diseases and territorial expansion led to the destruction of the native social and economic order.

European Occupation

European presence in the northeast Arkansas-southeast Missouri area was minimal until 1700, and for some time afterwards was largely confined to trade and travel along the major rivers. Some permanent European settlements were apparently begun by 1800, before the Louisiana Purchase, but substantial occupation by non-natives did not begin until well into the 19th century. This occupation was generally restricted to levee areas, where soils were easier to farm than in backwater zones. Logging was an also an important activity in the general study area.

In the last 100 years, extensive drainage projects and mechanized tools have allowed the spread of farming into areas with less tractable soils. This, combined with timber-cutting and other activities, have greatly changed the study area, not only biologically but also in terms of its adverse affect on cultural resources.

ISSUES

The current project was concerned with two basic problem domains, each of which is fundamental, yet compatible with the limited data usually obtained at the survey level. The first domain is that of establishing chronology and culture history.

Examining any issue in culture history is predicated on the establishment of a firm and valid cultural sequence. The survey results, then, must be able to determine what components are present and which ones are absent in the survey area.

In terms of the what is known of the culture history in the general region, we would expect (if the terrain is suitable) that evidence for certain occupations will be highly variable. It seemed that sites from certain periods (such as the Middle Archaic and Late Woodland) would be less common in the survey area than sites from other periods. A basic goal of the project was, therefore, the identification of the ages and cultural affiliation of sites through the presence and relative frequencies of diagnostic remains.

Beyond this, however, it was believed necessary to establish a fuller understanding of the cultural content of chronological phases. Although it is expectable that phases would be based on ceramic variation, it is often unclear what other characteristics, if any, distinguish one phase from another (an excellent example of this is the distinction maintained between sites with Baytown series and Barnes series pottery). If specific ceramic differences cannot be correlated with other, more general differences (in adaptation, for example, or at least in the overall artifact assemblages), then the utility of the specific classifications must be questioned.

This presents an additional challenge in cultural historical reconstruction: not only to place sites in time and space, but to note their contents and establish how these vary from one named complex to another. This means that field notes and site collections must not only encompass diagnostic remains (i.e., those which allow assignment of a site to a named complex) but other, non-diagnostic items (site dimensions, unmodified flakes, bone, etc.) as well, so that variability in the latter case can be related to distinctions made on the basis of the former. Explanation of differences may not be possible at this initial stage of investigation, but at least the patterns can be described and the corresponding questions raised.

The second problem domain was the evaluation of site location. One of the factors usually believed by archaeologists to be crucial in explaining differences between cultures is how they relate to the natural environment. On the survey level, the most appropriate method of establishing adaptive variation is analysis of site locations relative to the distribution of natural resources.

From a research standpoint, an understanding of adaptive variability--in terms of settlement distribution--means that the factors leading to site location have been isolated and can be used to anticipate site distributions in similar areas. Assuming that sites are not distributed randomly, the degree to which adaptive strategies are understood should be reflected in suggestive statements of site location.

Because of the nature of the Belle Fountain survey (intensive coverage), the development of a predictive model was not formally considered a research concern. Rather, we were interested in using the data from the survey to assess site preference and variation in the project area.

CHAPTER FIVE

INVESTIGATIVE PROCEDURES

Subsequent to portions of and concomitant with the remainder of the background and literature search, NWR initiated fieldwork on the Belle Fountain project. Field investigations consisted survey, site recording, and geomorphological examination. Procedures followed in these tasks are described below.

SURVEY PROCEDURES

The survey was designed to ensure that the entire project area received thorough coverage through the use of standard archaeological survey techniques. From approximately mile 12.25 on State Line Outlet Ditch north, the entire project area is under heavy cultivation. As a result, during our survey virtually the entire impact corridor, including the existing man-made levee system, had been plowed. In many cases this plowing was in preparation for the planting of the winter wheat crop, but in some cases it was intended to facilitate spring planting (John H. Smith, personal communication).

Consequently, observational conditions were excellent and shovel testing, except to recover subsurface stratigraphic information, was not required. To understand the rationale behind this statement requires a slight venture into the nature of farming and associated archaeological site destruction as practiced in the Missouri "Bootheel" and adjacent Arkansas. As noted by Medford (1972) and Williams (1968, 1972) the problem and consequence of mechanized farming on archaeological sites has been known for some time, but the

effect of such practices on survey has been less assessed. Tremendous areas are stripped bare and brought by one process or another to virtually the same level. Opportunities for surface observation are therefore enhanced, even as the actual archaeological sites are destroyed (Medford 1972:58).

Closer to the drainage ditches themselves and within much of the project area an entirely different though related problem is encountered. In these areas it has been the practice of farmers (John H. Smith, personal communication) to continually plow the existing levees into the surrounding fields (Figure 12). This is, of course, part and parcel of the land leveling syndrome and a desire to increase, however slightly, crop acreage. Its effect on survey is quite evident as the formerly leveled surface of the field is generally buried under at least one-half meter of plowed and spread levee spoil. Our subsurface tests consistently revealed this pattern of distribution with levee spoil on top of and intermixed with the already plowed surface of the field. Conversations with local farmers indicated that this practice had begun soon after the initial clearing. These conversations also substantiated our interpretation of the extent of this levee spreading and that levee spoil could best be identified by the presence of freshwater snail and mussel shell within its matrix. Some idea of the magnitude of the soil movement involved can be gained from the fact that such shell was frequently observed as much as 100 m from the existing top bank of the levee.

FIGURE 12. MAIN DITCH 9 CONSOLIDATED DISTRICT 1 (M9C1) VIEW SOUTH ALONG DITCH LINE (EXTREME LEFT), EXISTING M9 LEVEE PLOWED FIELD, SECONDARY DRAINAGE DITCH AND COUNTY ROAD. Note extreme disturbance.

Archaeological survey under such conditions is primarily a process of surface observation and, where possible, subsurface inspection. It was, therefore, necessary to substantiate that the surface under the spread levee had been plowed or that the original surface was buried so far under the spoil that it was inaccessible to normal archaeological inspection procedures. Once this situation had been clarified the standard survey procedures could be employed throughout.

The project impact zone was covered by a crew of three walking equi-distant linear transects. If the impact zone was too extensive to be covered by three surveyors in one pass, it was rewalked in the opposite direction until complete coverage had been obtained. In actual practice one pass was generally sufficient since the 120 m survey corridor exceeded the actual impact zone.

Spacing of the transect interval was determined by the size of the impact area but in no case exceeded 30 m. This 30 m interval was designed to achieve a site recovery rate of a least 85 to 95 percent in heavily wooded areas (cf. Thomas et al. 1982). Therefore, as we initiated the pedestrian survey in a plowed context, we fully expected site recovery to be equivalent or in excess of the recovery rate for heavily wooded areas.

This situation is generally true except for the potential of buried surfaces. In the case of the Belle Fountain project, pedestrian survey alone is insufficient to evaluate sites that may now lie well below the plowed surface. The extent of levee spoils evident in the project corridor bore witness to this problem. Such sites, if present, would be too deeply buried under levee spoil to detect from the surface. Therefore, to increase recovery chances and ensure complete coverage of the impact area a supplemental technique was required.

The approach we chose was to employ a boat for survey and as a means of examining the natural surface that existed beneath the present levee. At this juncture it is important to understand that the present drainage system is the result of a number of dredging episodes each one of which has resulted in the enlargement and deepening of the present channel. As a result, the present drainage and levee system has been more built up than dug down. This becomes clear when one stands atop the levee and observes that the center of the field is on approximately the same level as the surface of the water in the ditch. Schematically this situation might be pictured as follows (Figure 13).

As a result, the natural surface should be exposed on the bank line of the ditch and perhaps just a little above the present water level. Since the ditches have become thickly overgrown with reeds, horsetails, willows, and cattails natural bank exposures are infrequent. As a result, it was necessary to prepare artificial exposures at regular intervals from which sub-levee deposits could be observed. The interval chosen was 50 m. In some cases the muskrats and beavers

native to the ditches (especially L1-6, M6, L2-3, M-3, NF6, L5-6 and M-9) had created numerous exposures with which to supplement our artificial bank cuts.

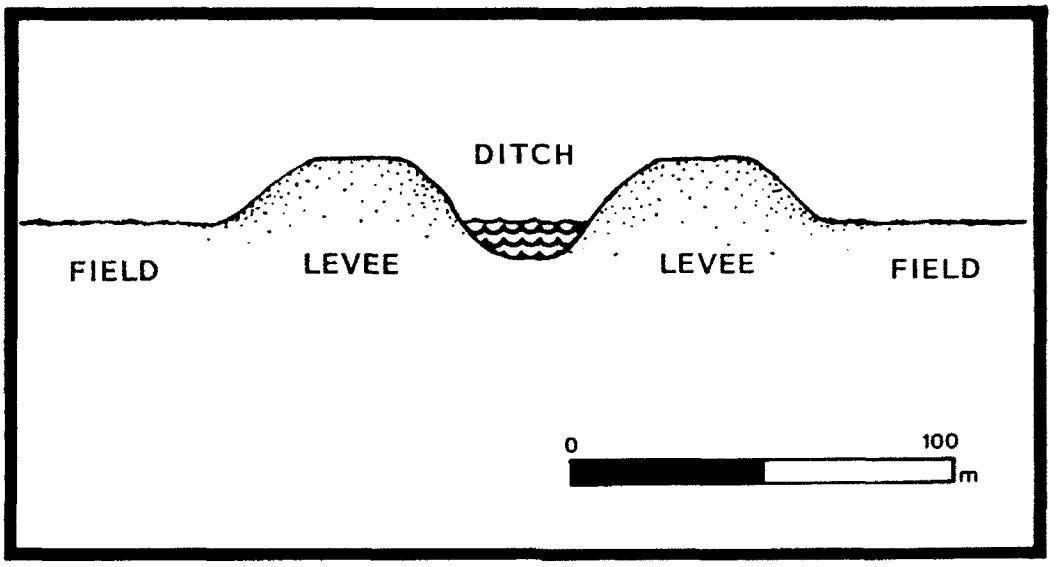

FIGURE 13. SCHEMATIC VIEW OF LEVEE, DITCH AND WATER LEVEL.

The combination of boat and pedestrian surveys was designed to allow NWR surveyors ample opportunity for the observation of cultural resources and the undisturbed surfaces with which they should be associated. It may be that we were somewhat overzealous in our approach to this survey but it has always been our feeling that it is best to err on the side of too much fieldwork rather than too little.

SITE RECORDING

Our plans for site recording were also rather detailed and involved a specific set of techniques which we have found to be of value in not only the recording of cultural resources, but in their subsequent evaluation as well. These techniques are generally based on a transect approach which allows in most cases for accurate recording of site size, locations, density, and variability. Equally important is the adaptability of this approach and the ease with which changes in the basic framework can be adopted.

All cultural materials identified during the survey are plotted on appropriate U.S.G.S. maps. When such a locus of materials was encountered the site recording procedures alluded to previously went into effect. We defined a site, for the purposes of this survey, as

four or more artifacts located within a 20 m by 20 m area. Recent debris, such as beer cans and other modern trash were not to be considered as sites. Structural remains, however, such as foundations or wells, were considered to be sites even if artifacts were not present. Standing structures were also noted although we did not record those which investigation and interviews indicated had been constructed after 1930.

Isolated finds were treated as a separate category but were also plotted and recorded. Isolated finds are here defined as cultural materials that occur as single items or in quantities less than the minimum definition of a site.

Site recording was initiated by a general reconnaissance of the site area, to provide a preliminary assessment of site size. Simultaneously a determination of the precise type of recording technique was also made. At this point it may be instructive to point out why a standard method for recording may be inappropriate. NWR has conducted numerous large surveys and, in so doing, has utilized various techniques for site recording. It has been our experience that rigid adherence to one technique or another does not always accomodate differences between sites or provide suitable data for assessing artifact density. Therefore, we used a very practical approach to site recording that is designed to maximize chronological data recovery, site definition, and site assessment.

The majority of the resources found on previous surveys have been small and usually roughly circular or elliptical in plan. We expected that this survey would display similar occurrences and our standard approach would be the application of a cruciform transect survey to determine site boundaries. This procedure involves the judgemental selection of the appropriate site center and the walking of transects in the four cardinal directions from their "center." Surface collections or shovel tests (depending on visibility) are normally made every ten meters along each transect. The cessation of artifacts for 20 m or more is considered an adequate definition of site boundaries.

There are, of course, sites that do not conform to this simple circular or elliptical configuration. We made plans prior to the initiation of the Belle Fountain survey to deal with such occurrences as semi-circular or u-shaped sites. We planned to utilize linear transects aligned across the site for this type of situation. The ten meter interval would, however, remain constant except for specific features such as wells or cellars. While the systematic transect approach was felt to be adequate for recording purposes we also recognized the fact that collections confined only to the systematic transects might not produce a representative sample of the material present. As a result, the entire site surface, once recorded, was to be checked for diagnostic materials.

At Belle Fountain, project requirements necessitated the use of a non-collection strategy and a premium was placed on accurate site

recording. The transect approach lends itself to this strategy very well and maximizes information recovery. In keeping with this non-disturbance strategy shovel pitting was kept to a minimum and only employed where necessary to establish the presence of subsurface materials. Arrangements were made to collect and record certain diagnostic items if, in the judgement of the Field Director, their interpretive value was significant.

In sum total, the techniques elucidated above are designed to maximize information recovery. Equally important are the site records generated as a result of each cultural resource encountered during the survey. These records are conceived as being most important to management of the resources encountered. These records include:

1) determination of horizontal size
2) determination of depth of deposit
3) evaluation of disturbance (by type and degree)
4) presence and type of in situ deposits (if applicable)
5) potential for the occurrence of midden pockets or features
6) general site stratigraphy
7) estimates of artifact densities
8) irregularities in site expression (e.g., whether there is seeming disparity between surface and subsurface materials)

In addition, records were kept on topographic setting, distance to nearest water, type of nearest water, soil association, geologic features, slope and other environmental variables or pertinent cultural markers.

SITE EVALUATION

Site evaluation procedures are intended to provide management with a statement of significance, in terms of national, state or local history or prehistory, for each site discovered. Three factors are considered for each property:

1) assessment of past impacts
2) assessment of future impact
3) assessment of the potential for yielding significant scientific information.

The field procedures outlined previously were designed by NWR to provide baseline documentation for each discovered cultural resource. Even without collection, visual inspection of the cultural materials in place should allow general categorization of each site in terms of its cultural chronology.

Such baseline documentation and the criteria outlined in 36CFR 60.6 can be utilized to determine site significance. We recognized that sufficient data might not be acquired during a project of this type. As a result, we planned to note those cases in which baseline

documentation was insufficient to make formal significance statements in the report.

Some of the known sites reported within the project such as the Campbell site (23PM5), the Denton site (23PM549) and the Murphy site (23PM43) have already been reported in enough detail for their inclusion in the National Register of Historic Places. We also made an attempt to revisit some of the other sites noted on the records at the office of the Missouri SHPO. Unfortunately, the majority of these could not be relocated due to imprecise plotting or the effect of recent disturbances. In any case, the essentially man-made ditches along which the survey was concentrated, away from the natural course of Pemiscot Bayou, seems to have attracted little archaeological investigation.

CHAPTER SIX

INVESTIGATION RESULTS

AND INTERPRETATION OF RESULTS

The Belle Fountain survey project produced only one archaeological site, two historic cemeteries and a few modern standing structures along its entire length. The very paucity of resources in an area known to be rich in archaeological information while requiring further explanation, is in itself an important datum.

There is one single and reoccurring reason for this lack of cultural resources; agricultural disturbance or rather destruction. The process has been described in detail (Williams 1968, 1972; Medford 1972) and much of what was foreseen has come to pass.

> "The archaeological sites in the area will be destroyed in the face of this efficiency drive. First to go will be the butchering camps and other small open sites, in fact, many of these sites are already gone. Small habitation mounds will be leveled early in the drive to facilitate irrigation crop production. The villages of the large sites will be carried or pushed into the relict river channels near which most of them are situated. Probably the last to go will be the large town mounds...Some...will go early in the game as they already have, to be used as fill dirt"(Medford 1972:77).

In the project area this particular set of circumstances is all too evident and has proceeded to its final phase. The large mounds like the one at the Murphy site (23PM43) near Caruthersville, Missouri, may still be intact but the associated villages are gone under the plow.

Based on geomorphic and soils data it would appear that most of the project area lies within what was, until the 1920s, a backswamp situation. In terms of the late prehistoric, and that is the time period represented almost exclusively by known sites, such areas would have low potential for sites of a more developed nature (Price 1974; Price and Price 1980:46). "Prehistoric peoples repeatedly settled on soils which occur on natural ridges and levees...sites tend not to occur...in low wet backswamps" (Price and Price 1980:43).

We would expect late prehistoric sites in such areas to represent what might best be termed extractive activity loci. Such loci would commonly be utilized for activities involving the extraction and processing of subsistence materials. Our experience in other areas with similar topographic conditions, such as east central Louisiana and west central Mississippi, lead us to believe that such sites will generally display characteristics of transient use, with a limited number of artifacts (Brown et al. 1978:177) with short biface tool trajectories. Generally such sites are small and diffuse accumulations of artifacts containing few recognizable or diagnostic tools. They are often termed lithic scatters. Some of these sites are almost certainly associated with hunting and butchering (Keller and Campbell 1982) but others are likely involved in plant processing; at present we lack the excavated data to allow differentiation.

SURVEY RESULTS: CULTURAL RESOURCES

Located Sites

The single site, designated 23PM568, located during the Belle Fountain survey is of the lithic scatter type. When observed in the field it consisted of an area in a plowed field measuring ten meters in diameter (Figure 14). This area contained four flakes (two secondary with cortex and two tertiary). None of these flakes showed any wear and/or retouch. A subsurface test 50 cm by 50 cm to a depth of 90 cm recovered one unworked tertiary flake and indicated that plowing extended to at least that depth. Undisturbed deposits might exist below 90 cm, but this could not be substantiated by normal archaeological recovery techniques. The leaseholder of the property indicated that deep plowing had taken place but could not supply a precise depth. It should be noted that the levee is not of extreme size in this area and that a National Register Property, the Campbell or Cooter Site, is located less than 500 m southwest and across the drainage ditch.

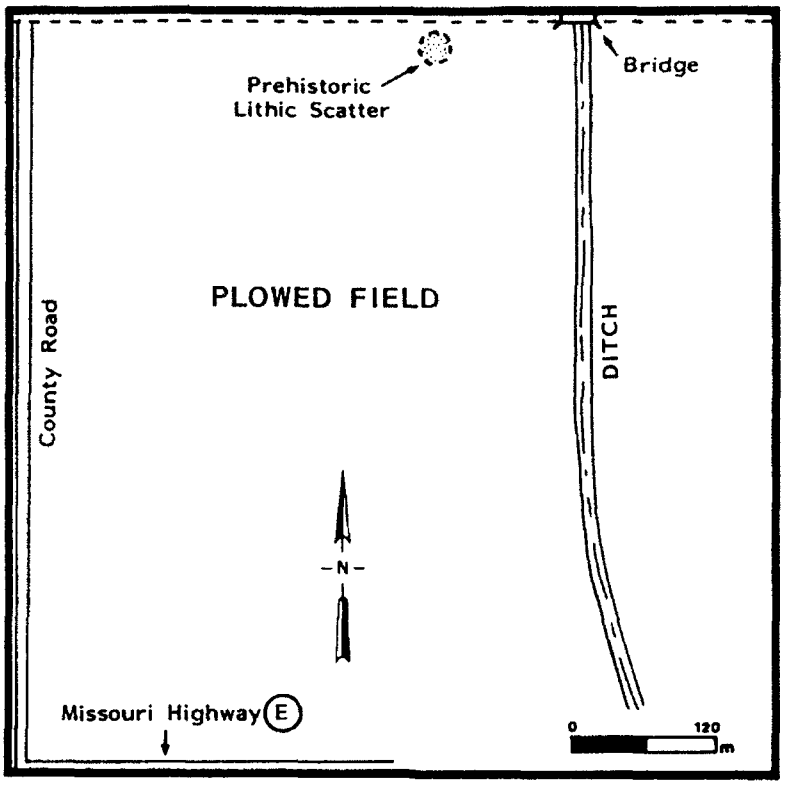

FIGURE 14. GENERAL SITE CONFIGURATION FOR 23PM568.

In addition to the prehistoric site, two historic cemeteries were located by the survey. Both are in locations, on rises or higher elevations, that might be considered suitable for prehistoric use. One of these, the Mt. Zion cemetery (Figure 15), associated with city of Steele, Misssouri is still in active use. This is a rather large cemetery, approximately 200 m by 75 m with its eastern edge less than 75 m west of the present ditch (BPS). The earliest graves date to the 1850s and are located atop a slight rise. This rise might contain prehistoric material but none is visible on the surface. Subsurface testing in this area was, of course, prohibited.

The Patterson cemetery (Figure 16), located west of Caruthersville, Missouri, and south of the present drainage (L2-5) is much smaller (ca. 20 m E-W by 45 m N-S). It is also inactive and located in a higher elevation. Considerable disturbance has taken place in this locality and while gravestones are evident they have obviously been moved. The landowner would not allow subsurface testing but did indicate that in times past he had "run off relic collectors" who were desecrating the cemetery. He did not know or care what they had been collecting. There were no surface manifestations of prehistoric cultural materials, but an archaeological site might exist in this location.

Standing Structures

Although the survey did not locate any standing structures within the project impact area that were constructed prior to 1930, we did

FIGURE 15. VIEW NORTH TOWARD MT. ZION CEMETERY. DITCH LINE IS AT EXTREME RIGHT.

FIGURE 16. VIEW NORTH FROM WESTERN EDGE OF PROJECT CORRIDOR TOWARD PATTERSON CEMETERY.

note the presence of several standing structures. The first of these is a group of three houses and the Macedonia Church. All four structures are within or immediately adjacent to the impact zone of M-6. A tenant, Mrs. Napoleon Elijah, indicated that the church was built in the 1950s. One of the houses may be somewhat earlier. All were photographically recorded (Figure 9).

FIGURE 17. VIEW OF THE MACEDONIA CHURCH AND STRUCTURE COMPLEX.

A second grouping of structures consists of a barn and a 1940s house on the property of John H. Smith. Mr. Smith indicated that both structures had been built after 1940. Each was photographically recorded. Mr. Smith did indicate that an Indian site existed across the ditch (L5-6) on the property of Mrs. Charles Reid. We checked this site which appears surficially as a large ceramic scatter. It is located approximately 50 m south of the present ditch, but has not been officially recorded by the Missouri Archaeological Survey.

Just outside the town of Steele, Missouri, the ditch (BPS) will impact an abandoned restaurant. This circa 1970(?) structure was not recorded. Similar modern structures were noted at the towns of Yarbro, Arkansas, Cooter, and Caruthersville, Missouri. In all these cases it appears that ditch construction will not directly involve structures that are presently in use although in a number of instances the zone of impact will be quite close. We did not consider these structures, which included cotton gins, the Cooter School, and service stations as warranting recording. They were noted for the convenience of Corps planners.

SURVEY RESULTS: AN EVALUATION OF LOW SITE FREQUENCY

In the preceding section of this chapter we have presented the data on cultural properties identified during fieldwork. The low incidence of cultural resources within the survey corridors mandates that some type of evaluation be made of the probable reasons for these areas not having hosted much prehistoric or historic activity.

In making these evaluations, however, it is necessary to return to our division of the survey area by segments. Although the segments display many similarities to one another, they also exhibit differences in terms of disturbance and certain environmental characteristics. Consequently, the reasons why one segment lacks evidence of cultural resources may not be the same for another segment.

Toward an accurate evaluation of site frequency, the following descriptions of the segments are presented. Embodied in these descriptions are suggestions for Corps planners, which are later summarized in the recommendations chapter which follows.

State Line Outlet Ditch Mile 0.0-12.25

As noted previously, this segment proceeds north from the junction of the SLO and Right Hand Chute of the Little River to State Line Ditch Number 29 (Figure 18). The project impact distance varies from 39 ft (11.8 m) to 400 ft (122 m) (from the existing top bank). There is also considerable variation in bank side orientation as specified in the Scope of Work. However, since disturbance conditions and general environmental situation are the same throughout the 12.25 stream mi (19.71 km) covered by the project area the entire segment can be discussed as one.

The dominant features of this segment are the banquette levees that line the ditch (see Figure 11). These are constructed levees of gigantic size, nearly perfect uniformity. The levee on the right bank ascending appears slightly larger. It is approximately ten meters high and very nearly 200 m wide at the base. The levee on the left bank ascending which divides the ditch from the Big Lake National Wildlife Refuge, is slightly less massive but is still 7.5 m high and 100 m wide at the base. Both levees have well-developed gravel roads along their crests. As indicated by Figure 18 (inset), these levees completely cover the entire impact zone at depths exceeding one meter. Under such conditions cultural resources if present and/or intact cannot be detected by normal archaeological techniques. Local informants indicate that the levee system is primarily the result of spoil bank accumulation attendant on the deepening and enlargement of the present ditch. Neither levee is subjected to plowing.

Observation of the adjacent land surfaces and geomorphic information indicates that the surrounding area was generally backswamp when drainage projects were initiated. This condition is still prevalent in the Wildlife Management Area where a full-scale bottomland

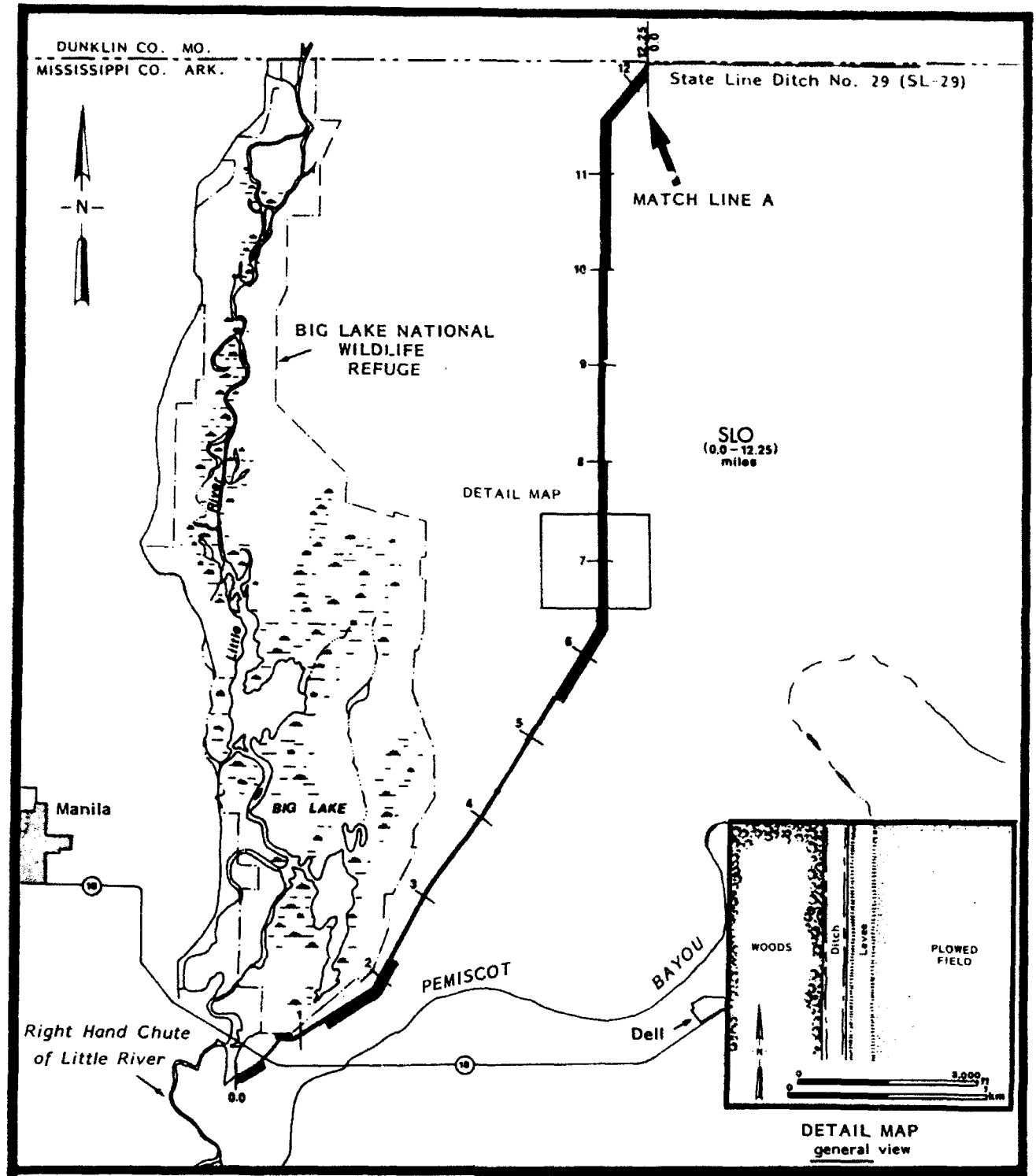

FIGURE 18. STATE LINE OUTLET DITCH (SLO).

forest (Kuchler 1964; Bruan 1950) exists in relatively undisturbed condition. On the basis of our observations it is this undisturbed forest area that deserves careful attention for both subsistence studies and archaeological site locations. In our view, the area represents very nearly the only opportunity for studies under undisturbed conditions in the project area.

We detected no cultural resources in this segment. This is hardly surprising given the degree of subsurface and surface disturbance present in the area. There remains the distinct possibility that, due to prevailing environmental factors, archaeological sites are uncommon within the project area. This hypothesis is lent some credence by the fact that the Dell Site, the only known Mississippian ceremonial center in the vicinity, is approximately 11.2 km east of the project and on the natural levee between Pemiscot Bayou and the original backswamp. This backswamp includes the project corridor.

State Line Ditch No. 29 Mile 0.0-10.7

The first 0.44 mi (700 m) of this project consist of an impact zone of 300 ft (91.4 m) on only the left bank (Figure 19). Perhaps not surprisingly this portion of the project is a continuation of the State Line Outlet Ditch. As such it displays the same degree of disturbance and is in the form of a continuation of the giant banquette levee system previously observed. This levee and that associated with Belle Fountain Ditch proper have impacted an area of over 800 m. The impact zone is virtually completely covered by levee. We observed no cultural resources.

From mile 0.44 to mile 2.16 the project will impact the right bank only for a total distance of 250 ft (76.2 m) from the existing top bank. This portion of the segment is also in a state of severe disturbance with a continuation of the same sort of banquette levee present downstream. This subsegment occupies an area about 100 m wide but set back from the top bank about 25 m. At first glance this narrow corridor between the ditch and the levee appears undisturbed. However, while there are actually trees growing in this area, none of them is older than 40 years (as determined by coring). Disturbance in this area apparently has resulted from the construction of a smaller and older levee system. While fragmentary, the older levee system appears to have been constructed either at the bank line or less than three meters from it. The system has been enlarged and/or altered by subsequent deposit of dredge spoil. Shovel testing at 30 m intervals was carried out throughout the area between the two levees. The shovel tests revealed that the deposits are solid gumbo clay from the surface to a depth of at least one meter. Mr. Charles Little who has lived on the Arkansas side for over 50 years says that the area was originally backswamp which was scraped and cleared prior to the construction of the smaller levee.

We observed no cultural resources within this project segment. The disturbance and environmental factors previously noted are

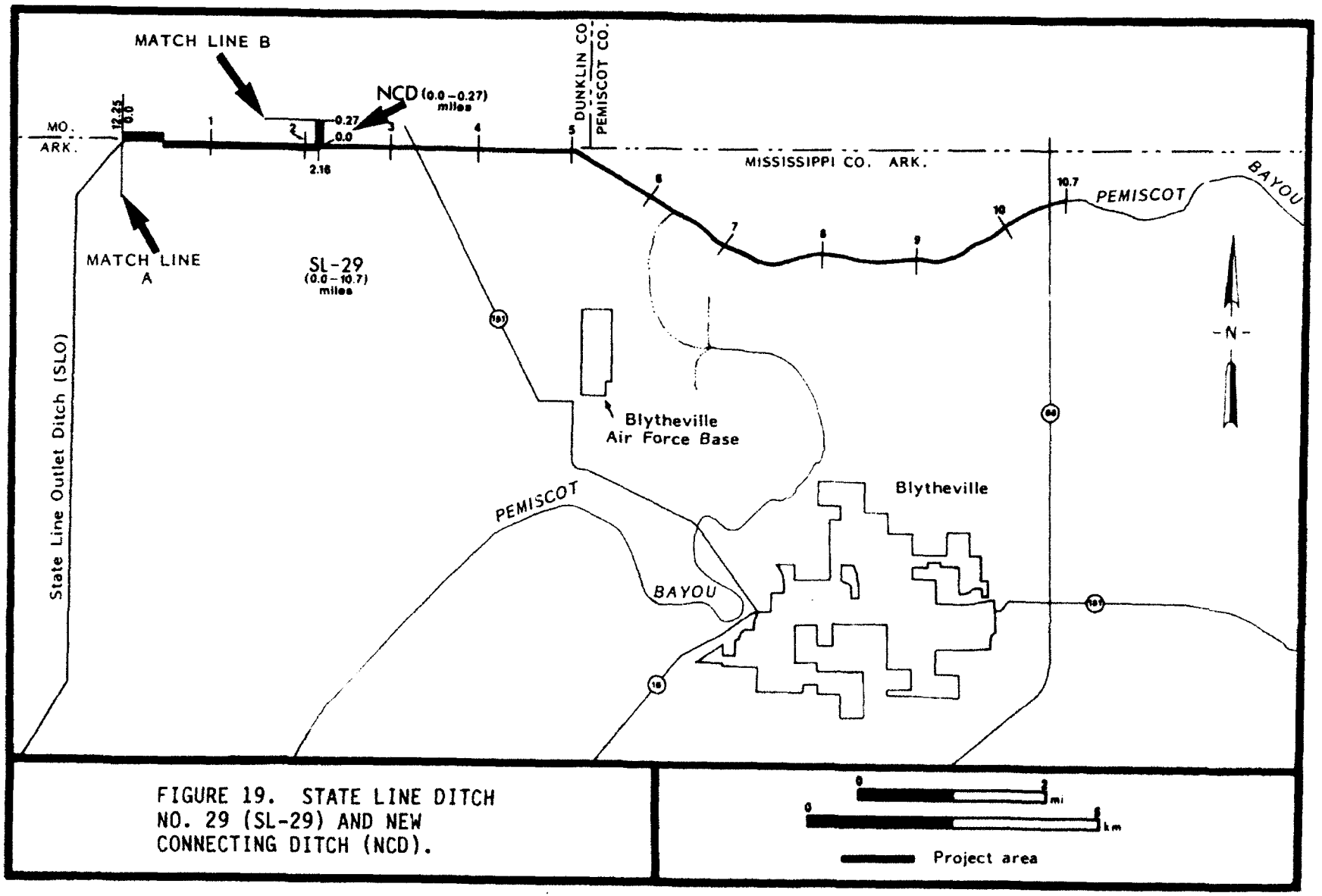

FIGURE 19. STATE LINE DITCH NO. 29 (SL-29) AND NEW CONNECTING DITCH (NCD).

considered to provide ample reason for this lack of sites. Certainly this lack of sites is in line with Morse's (personal communication) statement regarding the implausibility of sites occurring within backswamp area.

From mile 2.16 to mile 7.4 is a right bank enlargement that may only impact a width of 100 ft (30.48 m) outside the existing top bank. Although the extremely large banquette levee extends only to the crossing of Arkansas 181 (approximately mile 5.2), the entire project impact zone has been leveed. From mile 5.2 the levee is smaller (i.e. 35 m), but still covers most of the impact zone. The levee and the remaining portion of the impact zone have been deeply plowed. At the time of the survey the corridor had been recently harvested and replowed. Surficial conditions were, therefore, excellent for observation and shovel testing was not deemed to be necessary. The soils throughout are predominantly a light brown sandy gumbo clay.

There are cultural materials present in this segment although they are not significant in terms of National Register criteria. None were over 50 years of age and most of the cultural materials are in the form of modern trash dumps associated with erosional control efforts in the numerous gullies. In addition, the remains of a 1940s era house are present just outside the impact zone at approximately mile 6.4. The 1976 quadrangle map (Blytheville, Ark.-Mo.-Tenn.) indicates a standing structure at this locality, but the man operating the tractor in the adjacent field indicated that the structure had been razed in the early 1970s. This concentration of cultural material was deeply plowed and is not eligible to the National Register. The fact that our survey located this concentration may be taken as an indication of the efficiency of the pedestrian survey techniques.

At approximately mile 6.5 Ditch 29 joins the natural course of Pemiscot Bayou. Disturbance in this area includes not only the levee spoil accumulations but also Arkansas 150 which parallels the stream course. The entire impact zone has been heavily disturbed in consequence.

From mile 7.4 to mile 10.7 the project involves only channel clearing. The impact zone is restricted to a corridor 30 ft (9.1 m) on either side of the existing stream, Pemiscot Bayou. Despite the fact that this is a natural stream it has been artificially dredged and leveed. Other disturbances include the town of Yarbo, Arkansas, between mile 8.5 and mile 9.0; U.S. Highway 61 at mile 9; and Interstate Highway 55 between mile 10.4 and mile 10.7.

Aside from these construction projects the impact zone has been severely impacted by mechanized agriculture. Even the levee has been cultivated up to the present ditch line. Erosional gullies within this segment have also been filled in with trash.

No cultural resources were observed in this segment. In the main this is felt to be the result of disturbance factors. It should be noted that as a natural drainage, Pemiscot Bayou has a higher potential for cultural resources than a man-made ditch. However, soils within the impact corridor are basically clays (Ferguson and Gray 1971) and as observed by Price et al. (1978) and Price and Price (1980) these soil types are not generally favored for prehistoric or historic settlement. Sites may very well be present outside the narrow impact zone. In fact a number of relatively high ridges with loamy soils were observed north of the survey corridor. These were felt to have a higher potential for cultural materials but were not investigated since they were plainly outside the impact corridor.

New Connecting Ditch

This project segment connects State Line Ditch Number 29 and Belle Fountain Ditch (Figure 19). The project impact zone is 0.27 mi (.43 km) long and 440 ft (134.1 m) wide. This area has been badly disturbed by a series of large banquette levees between the two ditches. These are each approximately 100 m wide and thus impact an area of approximately 200 m. The area between these two massive constructions is less disturbed but already has a sizeable drainage ditch within it. Shovel tests and examination of the ditch banks disclosed purely backswamp soils (Gurley 1979). No cultural resources were observed.

Belle Fountain Ditch

This segment (Figure 20) extends up Belle Fountain ditch from the New Connecting Ditch (mile 2.50) to its junction with Main Ditch 9 (mile 6.29). While the impact zone varies in width and from side to side, the entire corridor is marked by extensive banquette levees. These are most extensive on the left bank ascending where they cover the entire impact zone from mile 2.50 to mile 5.39. Width of this levee at the base is 100 m. Furthermore, a series of lateral ditches have been constructed parallel to the Belle Fountain Ditch proper. These extend the impacted corridor even further from the existing top bank. From mile 4.2 to mile 5.39 the impact is on the right bank ascending and for a distance of 150 ft (45.7 m). The levee or dredge spoil on this side is less extensive than on the other side. Nevertheless, this fill is at least 75 m in width at the base and covers virtually the whole impact corridor. At approximately mile 4.3 it appeared to the surveyors that the project would impact a fish hatchery operation.

From mile 5.60 to mile 6.29 both sides of the ditch will be impacted. Width on the left bank, where the most extensive levee is present, is 270 ft (82.2 m). The right bank has an impact zone of only 100 ft (30.4 m). Both banks are covered by extensive levees.

Considering the degree of disturbance present along this stretch of Belle Fountain Ditch, it is hardly surprising that no cultural

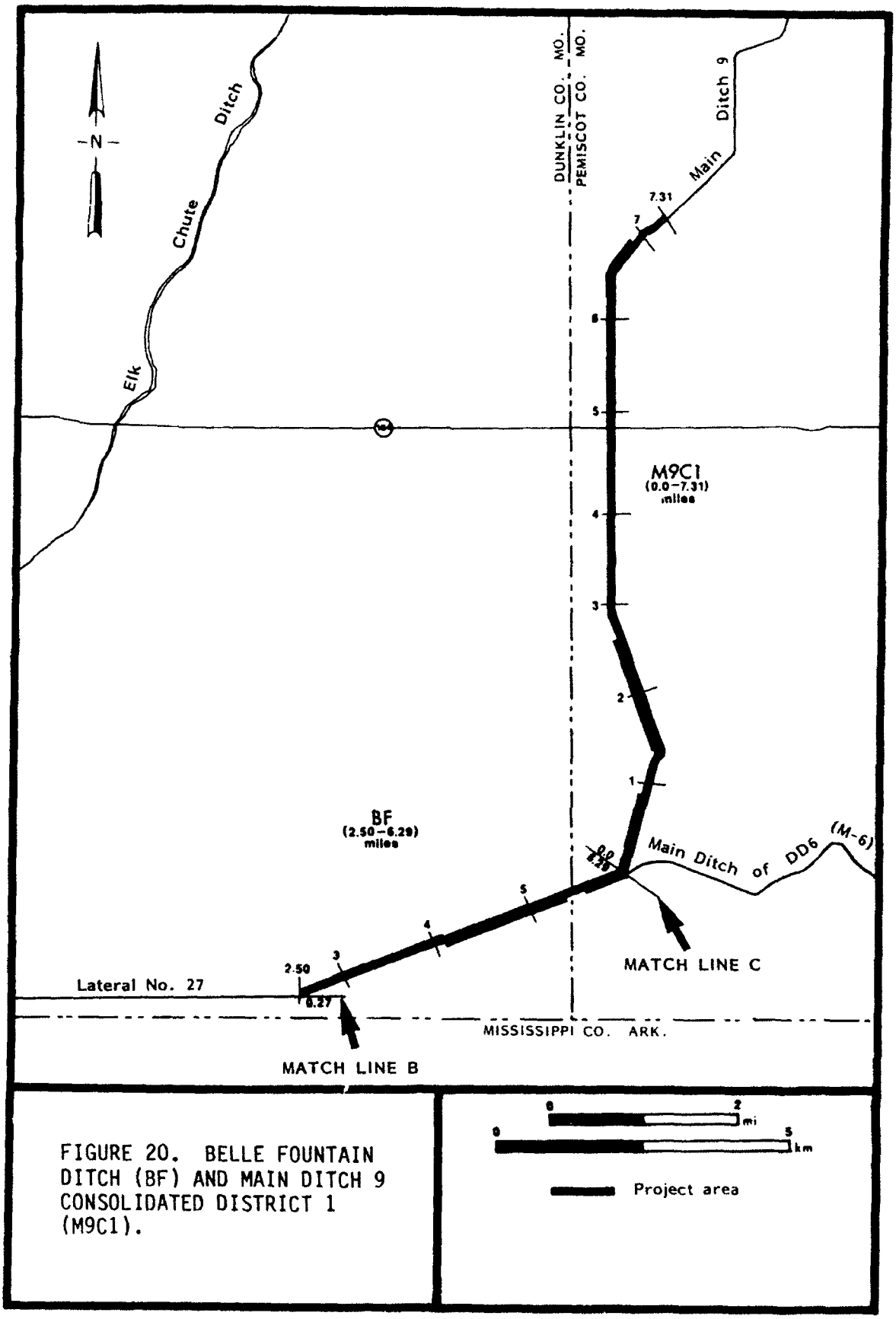

FIGURE 20. BELLE FOUNTAIN DITCH (BF) AND MAIN DITCH 9 CONSOLIDATED DISTRICT 1 (M9C1).

resources were observed. In addition to these disturbance factors, it is probable that environmental factors also play a role in the paucity of cultural resources. In the first place these ditches are not primarily the result of alteration of natural drainages. In other words, the waterway either was not present in the past or was only a minor drainage. This situation tends to confirm the backswamp character of the environment indicated by the prevailing soils (Gurley, 1979; Brown 1971).

Main Ditch 9 Consolidated District 1

This segment (Figure 20) involves only a left bank ascending enlargement but width of impact varies from 210 ft (64 m) to 400 ft (121.9 m). These varying widths were covered by expansion or contraction of the survey corridor as appropriate. As might be expected this ditch has been heavily leveed. The predominant feature is a left bank banquette levee approximately two meters high and 75 m wide at the base. A large lateral ditch parallels this levee and extends the present zone of disturbance to approximately 125 m from the existing M9C1 ditch. Thus, the proposed impact zone has already been significantly disturbed and/or covered to an extent that normal archaeological survey techniques are ineffective. Boat survey and cuts at bankside reveal that levee extends to the waterline.

No cultural resources were observed along the M9C1 ditch. Disturbance is once again a factor and could of course, have destroyed or obscured any artifactual materials. We suspect, however, that such resources were never very common in this area. The operational environmental factor in this situation appears to be the prevalence of backswamp conditions as indicated by the characteristic Sharkey association soils (Brown 1971).

Main Ditch of DD6

The enlargement of Main Ditch 6 (Figure 21) is on the left side only from mile 0.0 to mile 6.0. Once again the impact zone varies in width and as might be expected there are considerable piles of levee spoil present on both banks. Mr. John H. Smith, a local resident, indicates that spoil is produced by dredging every ten years. The next such dredging is due about 1985 and the next accumulation of spoil will be dumped on the existing left bank levee.

The existing levee within the impact zone has been vigorously plowed, and considerable effort appears to have been directed toward reducing its height. Natural erosion and the plowing have moved considerable amounts of spoil into the adjacent fields. We observed, for example, the presence of much freshwater shell in the fields as far as 150 m from the present ditch line. Shovel testing revealed the extent of this soil movement and disclosed that spoil deposits in fields often exceeded a meter in depth. This, of course, rendered the usual archaeological techniques ineffective and increased reliance on the boat survey and associated bank cuts. Unfortunately these did little more than confirm that levees extending to the waterline.

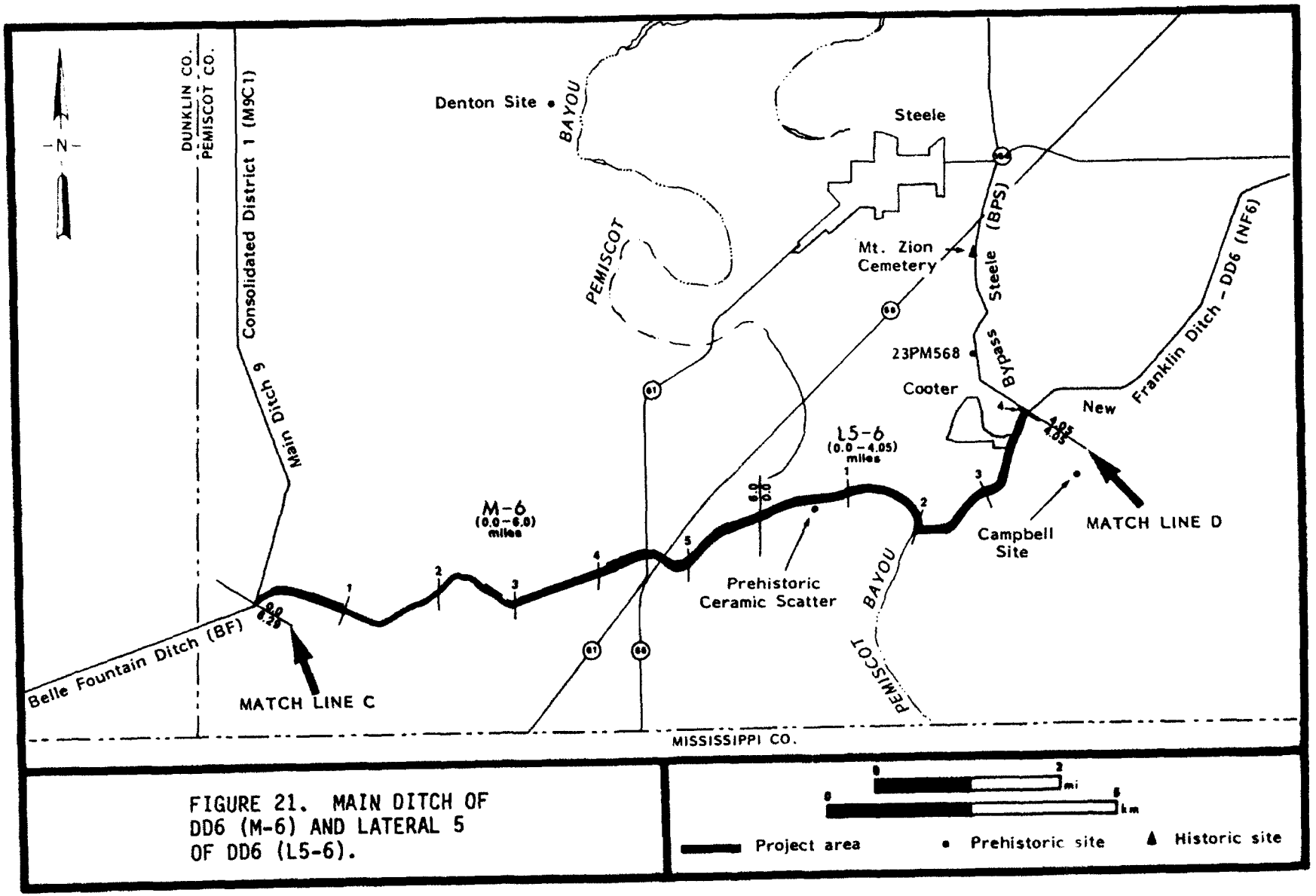

FIGURE 21. MAIN DITCH OF DD6 (M-6) AND LATERAL 5 OF DD6 (L5-6).

Soils were revealed to be generally loamy silts and clays considered typical of backswamp conditions (Brown 1971). The lack of cultural resources is not, then, surprising and is in line with previous investigations (Price and Price 1980).

At approximately mile 1.9 this segment of the project will impact the complex of standing structures that includes the Macedonia Baptist Church. None of these structures are eligible to the National Register of Historic Places as all are less than 40 years old. Nevertheless, they will be impacted by the project if the proposed enlargement does, in fact, take place.

Lateral 5 of DD6

From mile 0.0 to mile 2.0 this portion of the project follows the channel of Pemiscot Bayou (Figure 21). From mile 2.0 to its terminus with New Franklin Ditch and Main Ditch Number 6, however, it follows Ditch Number 5.

Once again the majority of the project impact zone, which is 300 ft (91.4 m) wide, is covered by an extensive plowed levee and levee spoil accumulation. The process of plowing the levee spoil into the field is well advanced. Nevertheless, the levee on the left side is approximately two meters high and 60 m wide at the base. Thus the unleveed portion of the impact corridor is less than 40 m wide. Even this unleveed portion has been impacted by levee plowing and we frequently observed fresh water mussel shell as much as 350 ft (106 m) from the top bank of the existing ditch.

Since a portion of this segment occupies the Pemiscot Bayou channel, pedestrian survey and boat survey were especially intense within what was regarded as an area of high cultural resource potential. Most of the area is unfortunately composed of silty clay loam soils where the presence of cultural resources is less expected. Boat survey and the associated bank cuts confirmed that these soils are present throughout.

On the other side of the channel, however, at approximately mile 0.5, local informants including Mr. John H. Smith and Mrs. Charles Reid showed us an intensive ceramic and lithic scatter. This site is located on a slight elevation and within a concentration of Caruthersville fine sandy loam soil. As such it conforms to the predictive model advanced by Price and Price (1980). Since this site was outside the impact zone we have merely noted its presence for management purposes. It is possible that this prehistoric site is somehow related to the Campbell or Cooter Site which is also located adjacent to the right bank of Ditch Number 5 and the New Franklin Ditch. The Campbell Site is a National Register property but it lies outside the project area.

For management purposes we noted the presence of a standing structure of 1940s vintage and a barn within the project impact zone. This property, which is not eligible to the National Register, is located at approximately mile 0.6.

The Ditch Number 5 portion of the project resembles the portion along Pemiscot Bayou in terms of disturbance and even soils. Levee plowing has resulted in depths of levee spoil, in the adjacent fields, that exceed 80 cm. The existing levee spoil bank is still quite massive and averages 25 m high and 75 m wide at the base.

Bypass Steele

From mile 0.0 to mile 3.20 (and junction with Main Ditch Number 6) this segment is another left bank enlargement (Figure 22). Total impact zone width varies from 310 ft (94.4 m) to 460 ft (140.2 m). As might be expected much of this segment, particularly the southern half, has been heavily leveed and plowed. In fact virtually the entire impact zone is covered with plowed levee spoil which exceeds one meter in depth.

At approximately mile 1.0 and 100 m west of the present ditch, pedestrian survey located a small lithic scatter. This site as noted earlier designated 23PM568, is just barely within the impact zone and is approximately ten meters in diameter. We observed four flakes within this area, and subsurface testing to a depth of 90 cm produced one additional tertiary flake. The four flakes on the surface included two tertiary flakes and two secondary flakes. None of the flakes showed signs of retouch. In accordance with contract requirements, no collection was made. Soil is a silty clay loam (Cooter and Crevasse silty clay loam complex). There might be undisturbed deposits under the levee but the survey was unable to locate them. It should be noted that disturbance was extensive and that total depth of deposit appeared to be less than 50 cm. This depth had been impacted by plowing. This locality could be associated with the Campbell Site situated to the southeast, but the small amount of cultural material could not substantiate this association.

To the north of the site area, the pattern of deep plowing and levee leveling continues. There is one exception to this pattern, the Mt. Zion Cemetery, at approximately mile 2.0, which will be impacted by the project. The cemetery is large and is being actively used at present. While cemeteries are not normally eligible to the National Register this one does contain graves that date to the 1850s. Because the cemetery occupies a slightly elevated area it is just possible that intact prehistoric cultural materials might be present. The soil is a fine sandy loam like that predicted by the Price and Price (1980) model for potential resources. However, no cultural resources were observed on the surface and the cemetery circumstance precluded subsurface testing. We suspect, however, that project managers will want to consider this cemetery carefully before impacting its eastern boundaries.

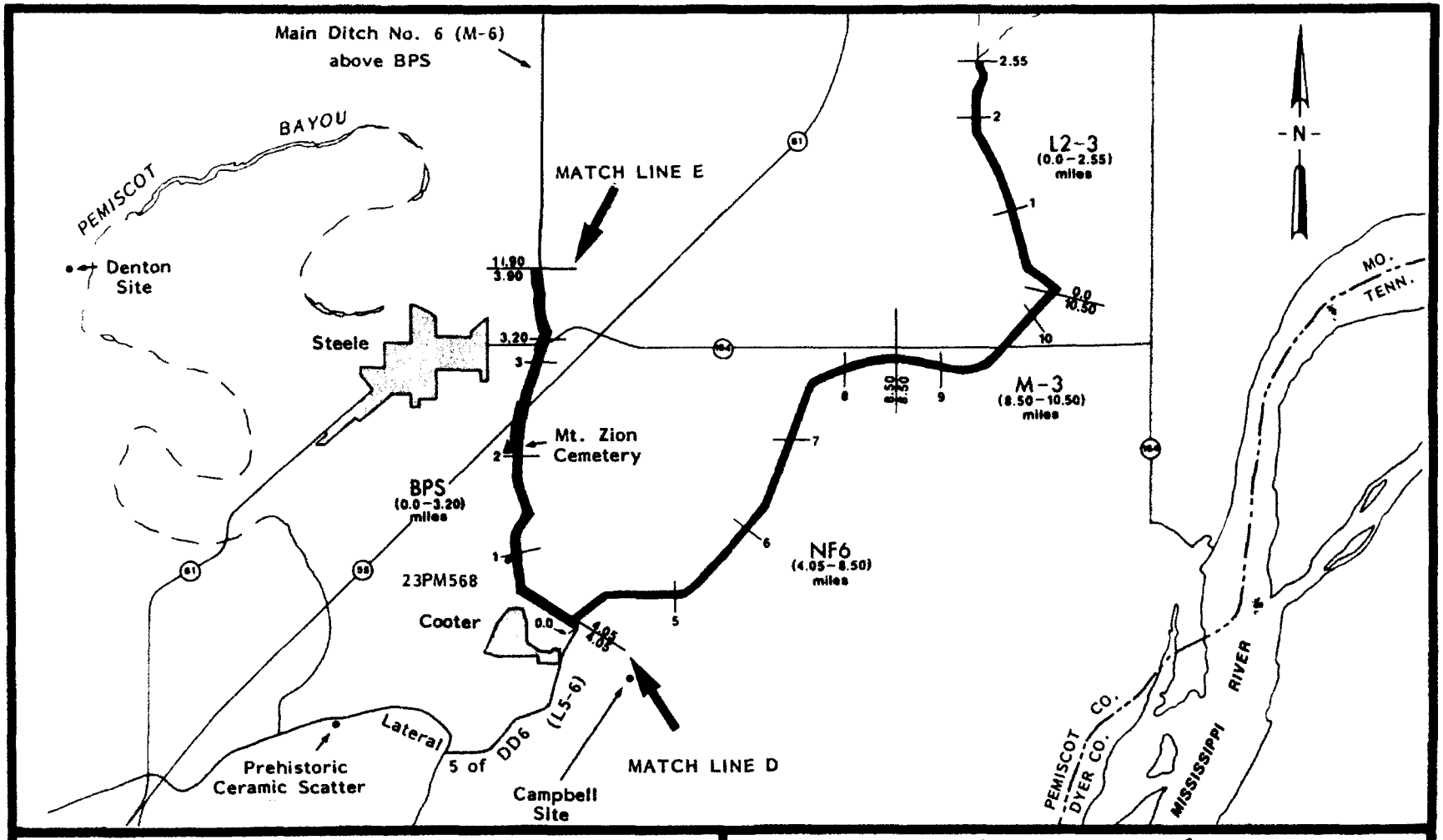

FIGURE 22. BYPASS STEELE (BPS), NEW FRANKLIN DITCH-DD6 (NF6), MAIN DITCH 3 (M-3) AND LATERAL 2 DD3 (L2-3).

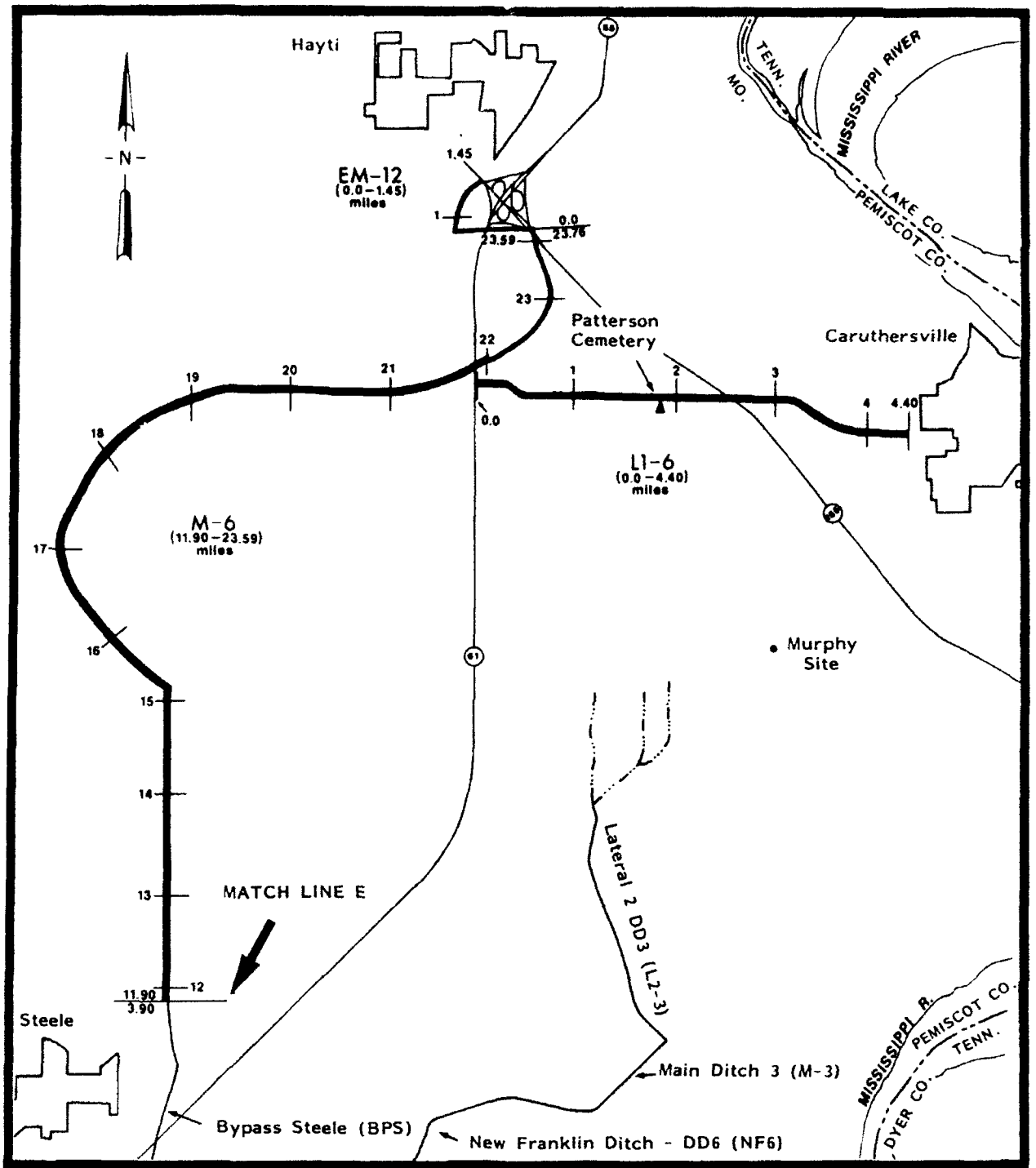

FIGURE 23. MAIN DITCH NUMBER 6 (M6 ABOVE BPS), LATERAL 1 OF DD6 (L1-6) AND EAST MAIN DITCH-12 (EM-12).

North of the Mt. Zion Cemetery the impact corridor includes a number of farm roads, Interstate Highway 55 and Missouri Highway 164. I-55 in particular has impacted a corridor that exceeds well over 500 m in width. This disturbance, as well as that associated with the development of the town of Steele and of course, farming, would have badly impacted any cultural resources that might have been present. No cultural resources were observed.

Main Ditch 6 above Bypass Steele

This is another long segment (from mile 11.90 to mile 22.2) that for a considerable portion of its length follows the natural Pemiscot Bayou channel (Figure 23). This is a left bank only enlargement and may impact a corridor 250 ft (76.2 m) in width.

The overall picture along this segment is one of unrelieved agricultural disturbance. Levee spoil piles are also very large and almost continuous along the present channel (Figure 24). These spoil heaps average 2.5 m high and 60 m wide at the base. In this particular segment it is relatively easy to discern that the level of the fields and water level in the ditch are nearly equal. The ditch itself is very shallow but despite the lack of trees along the levee hosted a number of wildlife habitats and associated wildlife. In fact the narrow corridor between the levees was one of the most undisturbed areas we observed.

FIGURE 24. MAIN DITCH 6 TYPICAL BANK EXPOSURE. Note that levee spoil extends to ditch line and supports vegetation.

No cultural resources were located along this segment. We attribute this to disturbance and the backswamp conditions that prevailed along the channel before the initiation of drainage projects (Brown 1971:41). Boat survey failed to locate any buried soil deposits that were not predominantly clays or silty clays.

From mile 22.2 to mile 23.59 this segment was for channel clearing only (to impact 30 ft or 9 m on either side of existing channel). This area had also been heavily leveed. These levees covered the entire impact zone. No cultural resources were observed. A portion of this segment has already been impacted by Interstate Highways 55 and 155.

East Main Ditch - 12

This is a short, 1.45 mi (2.3 km), segment that involves channel clearing only (Figure 23). Disturbance has been extreme in this area but not primarily as a result of mechanized farming. In this segment the impacts derive primarily from construction. Involved are the St. Louis-San Francisco Railroad, Missouri Highway J, Interstate Highway 55, Interstate Highway 155 and a borrow pit operation (now water filled). The main impact is from the I-55/I-155 interchange just north of the ditch. So much material has been borrowed, scraped and refilled in this area that no undisturbed deposits exist. A check of the Interstate Highway 55 archaeological salvage project report (Marshall 1964) revealed no known archaeological sites in this area or along that portion of Main Ditch Number 6 impacted by the interstate highways.

Lateral 1 of DD6

This is a right bank enlargement from mile 0.0 to mile 4.40 which will impact a corridor 200 ft (60.9 m) in width (Figure 23). This is much smaller ditch than most of the others investigated during the course of this survey. Nevertheless, disturbance has been extensive both from highway construction and mechanized farming. Interstate Highway 155 which crosses this segment at approximately mile 2.5 has, for example, impacted a swath of nearly 400 m.

A possible cultural resource was noted at the Patterson Cemetery at approximately mile 1.9. Like the Mt. Zion cemetery this area has not been overly disturbed, receiving some protection from the cemetery. The Patterson Cemetery has not been used for a number of years and some of the gravestones have been disturbed. Nevertheless, its function should be considered in management. In addition, there remains the possibility that the site contains prehistoric cultural materials. Although our investigations did not substantiate this possibility, the landowner did note that he "had run off some diggers." These individuals might have been looking for prehistoric materials or they might not have had this interest. We did no subsurface testing because of the landowner's wishes.

No other cultural resources aside from modern trash piles were noted. The project area does enter the city limits of Caruthersville, Missouri; however, the impact zone does not impact any standing structures. Some modern structures are apparent on the left bank of the present ditch, although it appears that the project will terminate before any impact to the Kentucky Fried Chicken or the Amoco Service Station noted by Iroquois Research (1980). If these structures would be impacted some revisions in routing might be necessary but they hardly constitute National Register properties.

New Franklin Ditch

This is another left bank-only enlargement (Figure 22) that will impact a width of 250 ft (76.2 m) for 4.45 mi (7.1 km). This area has been heavily disturbed by both levee spoil and mechanized farming. However, by remaining on the left bank the project will avoid impacting the National Register Campbell Site, which lies south of right bank of New Franklin Ditch but at some distance from the actual ditch line.

Disturbance in this area is mostly in the form of deep plowing. Some of the landowners note use of the California plow and disturbance depths of less than 60 cm are uncommon.

The levee system has itself been heavily impacted by this plowing regime. The remaining levee is less than 1.5 m high but still some 50 m wide at the base. As before, the complicating problem is the amount of levee spoil present in the fields often to depths exceeding a meter. There is one unplowed levee section that gives some idea of the degree of modification that has taken place. Here the levee is nearly four meters high and over 60 m wide. In the normal course of events all this material would be redeposited in fields adjacent to the ditch.

Under such disturbance conditions the lack of cultural resources is not surprising. In addition, the soil types crossed by this ditch are in the main those associated with old lake beds and backswamps (Brown 1971:7) which would not be expected to attract settlement. The Campbell site, perhaps significantly, occupies one of the few areas of natural levee soils (Commerce silt loam) present in the area (Brown 1971:6).

Main Ditch 3

This segment (Figure 22) is also a left bank enlargement that commences where the previous segment terminates. The impact zone is 250 ft (76.2 m) in width throughout the entire two mile segment. This segment resembles the previous one in both disturbance and soils. Most of the levee has been plowed and deposits of levee spoil often cover the entire impact zone.

No cultural resources were located in this area. We suspect that soils and their associated developmental environments are the primary factors accounting for the lack of sites. Disturbances cannot, of course, be ruled out and would certainly have removed evidence of the smaller and more diffuse occupations that might be expected in the exploitation of such moist ecosystems.

Lateral 2 DD3

This last segment (Figure 22) is a right bank enlargement, which will impact a zone of 250 ft (76.2 m) in width from the mile 0.0 junction with New Franklin/M3, to mile 2.55. In degree of disturbance and soil typology, this segment resembles the two previous segments. This is hardly surprising since all three cross what were permanently ponded areas until the advent of artificial drainage (Brown 1971:41). This circumstance may also do much to explain why the water level of the ditch is virtually equal to the levels of the surrounding fields.

Bank cuts examined during the boat survey indicated that heavy clays, often associated with lake beds, made up the bulk of the soil types. We were, however, able to examine soil profiles in this area in detail. The depth of the black gumbo exceeded three meters. A landowner recalled a core sampling project which showed the same soil type to depth of 40 ft (12.1 m) and he confirmed that most of the immediate area was once lake bed.

Between mile 1.2 and 1.5 enlargement will impact a narrow area of undisturbed Southern Floodplain Forest (Kuchler 1964). This vegetational community probably represents what the natural vegetation of the area was like prior to impacts. Cypress (Taxodium distichum) appears to be dominant. Considering the degree of destruction present elsewhere this "pocket" forest is rather unique and may need to be considered in the course of development. The forest was highly regarded by the local inhabitants of the area.

No cultural resources were observed in this segment. As indicated previously, the area is not felt to have offered much inducement for permanent large scale settlement. This when coupled with disturbance factors does much to explain the paucity of cultural resources.

Summary

The dominant theme throughout this discussion has been the severe disturbance of the land surface associated with mechanized farming and drainage. As noted by Medford (1972) and Williams (1968, 1972) this set of activities has been in operation for some years and the impact on cultural resources is severe. This is particularly true of the small diffuse scatters of cultural materials, probably related to subsistence extractive activities, that might be expected in the area.

Environmental data, especially that derived from soils, tends to support the notion of small subsistence exploitation stations. These would be an effective means of exploiting resources in an area characterized by backswamps, overflow lakes and a generally moist environmental situation (Gregory 1963). Judging from the exceedingly limited area of undisturbed conditions it would appear that the entire region was once dominated by Southern Floodplain Forest (Kuchler 1964), in which high ground was at a premium. Large occupations were limited to concentrations of well-drained soils along natural levees (Price and Price 1980) but the smaller extractive sites might be virtually anywhere. This non-selectivity and the ephemeral nature of the occupations means that the sites are especially susceptible to disturbance and outright removal. Under such conditions the lack of sites is hardly surprising.

CHAPTER SEVEN

RECOMMENDATIONS

The Belle Fountain survey did not result in the discovery of a large number of cultural resources (Figure 25 depicts the area surveyed in Missouri where the only archaeological site was identified and recorded). Nevertheless, we did note during the survey a number of occurrences that may require further consideration by Corps of Engineers planners and management personnel. For convenience these occurrences are listed on Table 1. The table also supplies information regarding location, segment position, and possible action. Details on each are presented in Chapters Five and Six.

The above recommendations are, of course, based on our survey results and we believe them to reasonably founded. There does remain the possibility that deeply buried archaeological sites might have escaped detection. This possibility is remote but if cultural materials were encountered during construction activities they might have considerable scientific importance. If such remains are encountered all activity in the immediate vicinity should be halted and the State Historic Preservation Officer of the appropriate state contacted for a professional assessment.

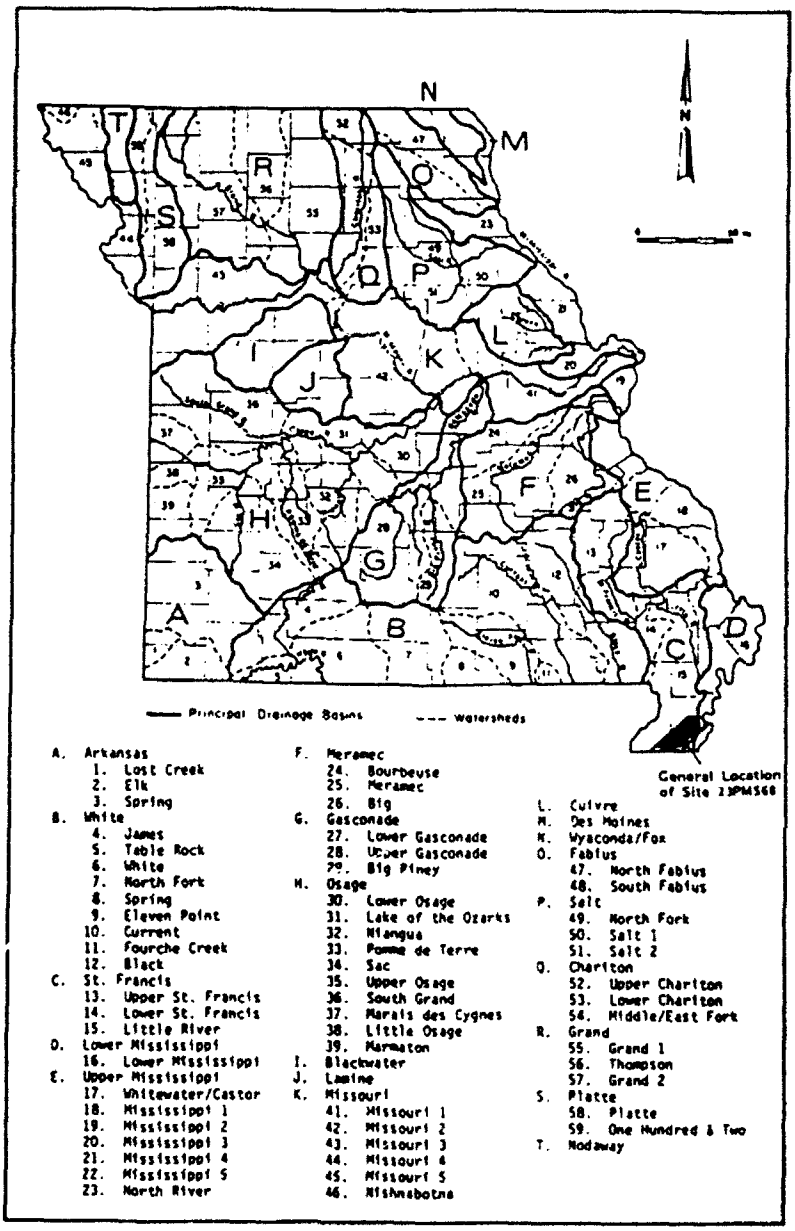

FIGURE 25. WATERSHED MAP OF MISSOURI SHOWING AREA SURVEYED AND LOCATION OF 23PM568.

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TABLE 1. CULTURAL OCCURRENCES BY SEGMENT

Occurrence	Segment	Location	Action
Lithic scatter (23PM568)	BPS	Left bank mile 1.0	Test
Mt. Zion cemetery	BPS	Left bank mile 2.0	Avoid
Patterson cemetery	L1-6	Right bank mile 1.9	Avoid
Macedonia Church complex	M-6	Left bank mile 1.9	Avoid
John H. Smith property	L5-6	Left bank mile 0.6	Avoid
Abandoned restaurant	BPS	Left bank mile 3.19	Avoid?
Town of Yarbro, Arkansas	SL-29	Right bank mile 8.5-9.0	Avoid
Town of Cooter, Missouri	L5-6,	Left bank mile 4.65-0.0	Avoid
	BPS	Left bank mile 0.0-0.2	Outside project area
Cooter Archaeology Site	L5-6,	Right bank mile 4.65	Awareness only
	NF6	Right bank mile 0.1	Awareness only
Mrs.Charles Reid Archaeological Site	L5-6	Right bank mile 0.5	Outside of project area, Awareness only
Forest remnant	L2-3	Right bank mile L2-1.5	Avoid

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APPENDIX I

LIST OF PROFESSIONAL CONSULTANTS AND LOCAL INFORMANTS

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LIST OF PROFESSIONAL CONSULTANTS AND LOCAL INFORMANTS

Professional Consultants

Dr. Dan F. Morse - Arkansas Archeological Survey (12-17-82): Discussed nature of cultural resources in area, diagnostic and chronological markers and status of project environment. Morse also offered some aid in identification procedures and information on sites adjacent to but outside the project area.

Cathy Moore-Jansen - Arkansas Archeological Survey (10-14-82): Provided AAS standard site forms and data on recording.

Hester A. Davis - Arkansas Archeological Survey (10-20-82 and 11-30-82): Discussed status of site recording in northeast Arkansas. Also spent considerable effort in determining status of sites in project area and in arranging for relocation visits to known sites.

Michael Weichman - Missouri SHPO Office (12-2-82): Spent 1.5 days reviewing status of cultural resources, nature of Missouri reporting requirements and reviewing SHPO's records both prehistoric and historic. Also reviewed appropriate literature.

David Griffin - University of Missouri (12-31-82): Reviewed reporting requirements and sites within the project area.

Local Informants

John H. Smith: Landowner with knowledge of local environment, cultural resources and conditions.
Mrs. Charles Reid: Landowner with knowledge of local conditions and cultural resources.
Napoleon Elijah: Leasee
C. W. Patterson: Landowner - local conditions; sites in area.
J. C. Gilliam: Landowner - local conditions; sites in area.
Kenneth Berry: Landowner - local conditions; sites in area.
Virginia Bader: Landowner - local conditions; sites in area.
Randolph Van Anstall: Landowner - local conditions; sites in area.
Robert E. Davis: Landowner - local conditions; sites in area.
J. C. Price: Landowner - local conditions; sites in area.
R. D. Hughes: Landowner - local conditions; sites in area.
Arkansas Fish and Game Commission: Landowner - local conditions; sites in area.

Landowners were contacted both for access and information regarding sites within the survey area. Only Mr. Smith and Mrs. Reid had any knowledge of sites when queried.

APPENDIX II

SCOPE OF WORK

INFORMATION TO OFFERORS OR QUOTERS
(Section A - Cover Sheet)

SOLICITATION NUMBER DACW66-82-R-0022
☐ ADVERTISED (IFB) ☒ NEGOTIATED (RFP)
☐ NEGOTIATED (RFQ)

ISSUING OFFICE *(Complete mailing address including Zip Code)*

Department of the Army
Memphis District, Corps Of Engineers
B-314 Clifford Davis Federal Building
Memphis, Tennessee 38103

ITEM(s) TO BE PURCHASED *(Brief description)*

Investigation, Analysis, Interpretation and Report Publication for Cultural Resources Along Ditch 1, Mississippi and Poinsett Counties, Arkansas, and Belle Fountain Ditch and Tributaries, Mississippi County, Arkansas and Dunklin and Pemiscot Counties, Missouri

THIS PROCUREMENT IS:

☐ UNRESTRICTED ☒ SET-ASIDE *(This is a 100 % set-aside for ☐ Small Business, ☐ Labor Surplus Area Concerns or ☒ Combined Small Business/Labor Surplus Area Concerns.) (See Section L of the Table of Contents in this solicitation for details of the set-aside.)*

NOTE THE AFFIRMATIVE ACTION REQUIREMENT OF THE EQUAL OPPORTUNITY CLAUSE WHICH MAY APPLY TO THE CONTRACT RESULTING FROM THIS SOLICITATION.

You are cautioned to note the "Certification of Non-Segregated Facilities" in the solicitation. Failure to agree to the certification will render your reply nonresponsive to the terms of solicitations involving awards of contracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause.

"Fill-ins" are provided on the face and reverse of Standard Forms 18 and 33, or other solicitation documents and Sections of Table of Contents in this solicitation and should be examined for applicability.

See the paragraph of this solicitation entitled "Late Bids, Modifications of Bids or Withdrawal of Bids" or "Late Proposals, Modifications of Proposals and Withdrawals of Proposals".

The envelope used in submitting your reply must be plainly marked with the Solicitation Number, as shown above and the date and local time set forth for bid opening or receipt of proposals in the solicitation document.

If NO RESPONSE is to be submitted, detach this sheet from the solicitation, complete the information requested on reverse, fold, affix postage, and mail. NO ENVELOPE IS NECESSARY.

Replies must set forth full, accurate, and complete information as required by this solicitation *(including attachments)*. The penalty for making false statements is prescribed in 18 U.S.C. 1001.

ADDITIONAL INFORMATION

"THIS IS A CIVIL WORKS PROGRAM PROCUREMENT AND IS NOT FUNDED BY THE DEPARTMENT OF DEFENSE.

BUY AMERICAN ACT PRICE DIFFERENTIAL TO FOREIGN QUALIFYING COUNTRY END PRODUCTS IN

ACCORDANCE WITH PARAGRAPH 6-104.4(f) OF THE DEFENSE ACQUISITION REGULATION APPLIES."

FOR INFORMATION ON THIS PROCUREMENT WRITE OR CALL

NAME AND ADDRESS	TELEPHONE *(Area Code, No. & Ext.)*	NO COLLECT CALLS

NO RESPONSE FOR REASONS CHECKED			
	CANNOT COMPLY WITH SPECIFICATIONS		CANNOT MEET DELIVERY REQUIREMENT
	UNABLE TO IDENTIFY THE ITEM(S)		DO NOT REGULARLY MANUFACTURE OR SELL THE TYPE OF ITEMS INVOLVED
	OTHER *(Specify)*		
	WE DO		WE DO NOT, DESIRE TO BE RETAINED ON THE MAILING LIST FOR FUTURE PROCUREMENT OF THE TYPE OF ITEM(S) INVOLVED

NAME AND ADDRESS OF FIRM *(Include Zip Code)*	SIGNATURE
	TYPE OR PRINT NAME AND TITLE OF SIGNER

FROM:

AFFIX STAMP HERE

TO: Department of the Army
Memphis District, Corps of Engineers
B-314 Clifford Davis Federal Building
Memphis, Tennessee 38103

SOLICITATION NO. DACW66-82-R-0022

DATE AND LOCAL TIME C.O.B., 82 JUN 17

SECTION C

SCOPE OF WORK

Archaeological Reconnaissance and Survey and Testing of Ditch 1, Arkansas and Belle Fountain Ditch and Tributaries, Arkansas and Missouri.

1. General

1.01. The Contractor shall conduct a background and literature search and a reconnaissance level investigation of Ditch 1, Mississippi and Poinsett Counties, Arkansas (see Section 2); and a background and literature search and intensive survey investigation of Belle Fountain Ditch and Tributaries, Mississippi County, Arkansas and Dunklin and Pemiscot Counties, Missouri (see Section 2). Separate detailed reports of results will be prepared for intensive survey and reconnaissance investigations. These tasks are in partial fulfillment of the Memphis District's obligations under the National Historic Preservation Act of 1966 (P.L. 89-665); the National Environment Policy Act of 1969 (P.L. 91-190); Executive Order 11593, "Protection and Enhancement of Cultural Environment," 13 May 1971 (36 F.R. 3921); Preservation of Historic and Archaeological Data, 1974 (P.L. 93-291); and the Advisory Council on Historic Preservation, "Procedures for the Protection of Historic and Cultural Properties" (36 CFR VIII Part 800).

1.02. Personnel Standards

a. The Contractor shall utilize a systematic, interdisciplinary approach to conducting the study. Specialized knowledge and skills will be used during the course of the study to include expertise in archaeology, history, architecture, geology and other disciplines as required. Techniques and methodologies used for the study shall be representative of the state of current professional knowledge and development.

b. The following minimal experiential and academic standards shall apply to personnel involved in cultural resources investigations described in this Scope of Work:

1. Archeological Project Directors or Principal Investigators (PI). Individuals in charge of an archeological project or research investigation contract, in addition to meeting the appropriate standards for archaeologist, must have a publication record that demonstrates extensive experience in successful field project formulation, execution and technical monograph reporting. The Contracting Officer may also require suitable professional references to obtain estimates regarding the adequacy of prior work.

2. Archaeologist. The minimum formal qualifications for individuals practicing archaeology as a profession are a B.A. or B.S. degree from an accredited college or university, followed by a minimum of two years of successful graduate study with concentration in anthropology and specialization in archeology and at least two summer field schools or their equivalent under

the supervision of archeologists of recognized competence. A Master's thesis or its equivalent in research and publication is highly recommended, as is the M.A. degree.

3. Other Professional Personnel. All non-archeological personnel utilized for their special knowledge and expertise must have a B.A. or B.S. degree from an accredited college or university, followed by a minimum of one year of successful graduate study with concentration in appropriate study.

4. Other Supervisory Personnel. Persons in any archeological supervisory position must hold a B.A., B.S. or M. A. degree with a concentration in archeology and a minimum of 2 years of field and laboratory experience

5. Crew Members and Lab Workers. All crew members and lab workers must have prior experience compatible with the tasks to be performed under this contract. An academic background in archeology/anthropology is highly recommended.

c. All operations shall be conducted under the supervision of qualified professionals in the discipline appropriate to the data that is to be discovered, described or analyzed. Vitae of personnel involved in project activities may be required by the Contracting Officer at anytime during the period of service of this contract.

1.03. The Contractor shall designate in writing the name of the Principal Investigator. Participation time of the Principal Investigator shall average a minimum of 50 hours per month during the period of service of this contract. In in the event of controversy or court challenge, the Principal Investigator shall be available to testify with respect to report findings. The additional services and expenses would be at Government expense, per paragraph 1.08 below.

1.04. The Contractor shall keep standard field records which may be reviewed by the Contracting Officer. These records shall include field notes, site survey forms and any other cultural resource forms and/or records, field maps and photographs necessary to successfully impliment requirements of this Scope of Work.

1.05. To conduct the field investigation, the Contractor will obtain all necessary permits, licenses, and approvals from all local, state and Federal authorities. Should it become necessary in the performance of the work and services of the Contractor to secure the right of ingress and egress to perform any of the work required herein on properties not owned or controlled by the Government, the Contractor shall secure the consent of the owner, his representative, or agent, prior to effecting entry on such property.

1.06. Innovative approaches to data location, collection, description and analysis, consistent with other provisions of this contract and the cultural resources requirements of the Government, are encouraged.

1.07. No mechanical power equipment shall be utilized in any cultural resource activity without specific written permission of the Contracting Officer.

1.08. The Contractor shall furnish expert personnel to attend conferences and furnish testimony in any judicial proceedings involving the archaeological and historical study, evaluation, analysis and report. When required, arrangements for these services and payment therefor will be made by representatives of either the Corps of Engineers or the Department of Justice.

1.09. The Contractor, prior to the acceptance of the final report, shall not release any sketch, photograph, report or other material of any nature obtained or prepared under this contract without specific written approval of the Contracting Officer.

1.10. The extent and character of the work to be accomplished by the Contractor shall be subject to the general supervision, direction, control and approval of the Contracting Officer. The Contracting Officer may have a representative of the Government present during any or all phases of the described cultural resource project.

2. Study Area.

2.01. The Belle Fountain Ditch and Tributaries Channel Enlargement Project is located in three counties: north-central Mississippi County, Arkansas; south-eastern Dunklin County, Missouri; and southwestern Pemiscot County, Missouri. The drainage of the tributary system is towards the southwest. The network of ditches and laterals converges into the State Line Outlet Ditch near the border of Dunklin County, Missouri and Mississippi County, Arkansas. The downstream terminus is at the intersection of the Right Chute of the Little River and the State Line Outlet Ditch immediately south of Big Lake. The upstream periphery of the drainage system extends from the southeastern reaches of Caruthersville, Missouri to the areas just southeast of Hayti, Missouri.

The planned improvements to the existing ditches include (1) the enlargement of 67.70 miles (108.94 kilometers) of existing channels by graded excavation (2) the construction of a berm parallel to the ditch using the excavated material and (3) the cleaning out of 6.14 miles (9.88 kilometers) of channel to its original dimensions. In addition to the above improvements, the excavation of .97 miles (1.56 kilometers) of new channel is planned.

The following describes the work by segments.

a. State Line Outlet Ditch (SLO) - 0.0 - 12.25

Mile No.	Project Impact (Distance from Top Bank)
0.10	310' right bank
0.45	360' right bank
0.70	39' right bank
0.72	300' left bank
0.90	300' left bank
0.92	150' left bank
1.28	150' left bank
1.30	100' left bank
1.30	400' right bank
2.22	100' left bank
2.22	400' right bank
2.24	100' left bank

3.53	150' left bank
3.97	150' lft bank
4.25	100' left bank
4.32	100' left bank
4.35	150' left bank
4.35	40' right bank
4.92	100' left bank
5.45	150' left bank
5.50	340' right bank
6.50	100' left bank
6.50	340' right bank
8.00	80' left bank
8.00	300' right bank
9.02	80' left bank
9.02	220' right bank
9.06	80' left bank
9.06	70' right bank
10.00	80' left bank
10.00	270' right bank
12.25	60' left bank
	310' right bank

The right bank, from Mile No. 5.35 to 5.65, is excluded from examination.

b. State Line Ditch No. 29 (SL-29) (mile 0.0 - 10.7)

(1) Left bank enlargement - mile 0.0 - 0.44.
Project may impact 300' outside existing top bank

(2) Right bank enlargement - mile 0.44 - 2.16.
Project may impact 250' outside existing top bank

(3) Right bank enlargement - mile 2.16 - 7.40
Project may impact 100' outside existing top bank

(4) Channel clearing - mile 7.40 - 10.7
Project may impact 30' from the top bank on either side of the existing ditch.

c. New Connecting Ditch (NCD) (connects SL -29 (2.16) to Belle Fountain Ditch (mile 2.50))
New channel enlargement - mile 0.0 - 0.27.
Project may impact 440' section.

d. Belle Fountain Ditch (BF) - mile 2.50 - 6.29

Mile No.	Project Impact (Distance from Top Bank)
2.91	300' left bank
3.24	330' left bank
3.44	310' left bank
4.20-5.39	270' left bank
4.20-5.39	150' right bank
5.60-6.29	270' left bank
5.60-6.29	100' right bank

e. Main Ditch 9 Consolidated District 1 (M9C1)
Left bank enlargement - mile 0.0 - 7.31

Mile No.	Project Impact (Distance from Top Bank)
0.27	320'
0.82	360'
1.37	300'
1.94	400'
2.70-6.25	290'
6.86-6.99	210'
7.31	240'

f. Main Ditch of DD6 (M-6)
Left bank enlargement - mile 0.0 - 6.0

Mile No.	Project Impact (Distance from Top Bank
0.21	220'
0.63	260'
0.95	280'
2.01	170'
2.06	240'
2.54	230'
2.80	280'
2.84	130'
3.04	270'
4.08	280'
4.54	320'
4.86	290'
6.00	300'

g. Lateral 5 of DD6 (L5-6)
Left bank 300' - mile 0.0 - 4.05.

h. Bypass Steele (BPS)
Consists of:
L3-6 and L12-6 - mile 0.0 - 3.20 (left bank enlargment)

Mile No.	Project Impact (Distance from Top Bank)
0.0-1.37	310' left bank
2.05-2.09	400' left bank
2.43	460' left bank
2.55-2.62	370' left bank
3.12-3.20	460' left bank

i. M-6 (above BPS) 3.90 BPS = 11.90 M-6
Left bank enlargement - mile 11.90 - 22.2
Project may impact 250' outside existing top bank
Channel Clearing - Mile 22.2 - 23.59.

j. Lateral 1 - DD6 (L1-6)
Right bank enlargement - mile 0.0 - 4.40.
Project may impact 200' outside existing top bank.

k. East Main Ditch - 12 (EM-12)
Channel Clearing - mile 0.0 - 1.45

l. New Franklin Ditch - DD6 (NF6)
Left bank enlargement - mile 4.05 - 8.5
Project may impact 250' outside existing top bank

m. Main Ditch 3 (M-3)
Left bank enlargement - mile 8.5 - 10.5
Project may impact 250' outside existing top bank

n. Lateral 2 DD3 (L2-3)
Right bank enlargement - mile 0.0 - 2.55.
Project may impact 250' outside existing top bank.

2.02. The Ditch 1, Arkansas Channel Enlargement Project is located in two Arkansas counties: north-western Mississippi county and north-eastern Pemiscot County. The project drainage is towards the southwest. The upstream portion of the project begins immediately south of Big Lake. The downstream terminious is near the town of Marked Tree, Arkansas at the confluence of Ditch 1 and the St. Francis River.

The planned improvements include (1) channel enlargement (2) construction of a berm parallel to the channel using excavated material and (3) the excavation of new channel. The planned project right-of-way extends 300 feet from the existing top bank on that side on which enlargement will be made. In some reaches, only one side need be investigated, in others, both sides.

The actual project length, including all alternatives, covers 65.45 stream miles (105.33 kilometers). For the purposes of the reconnaissance investigation the project area incudes 115.15 miles (185.30 kilometers) since at this time work could be on either side of the existing channel for 49.7 miles (79.98 kilometers) of the project length. A 15 percent sample of the project area would total 17.3 miles (27.84 kilometers).

The following describes the work by segments.

a. Ditch 1 (D1) begins at St. Francis River Mile 120.93 and extends up Ditch 1 to D1 17.23. From D1 1.4 to D1 6.7 enlargement will be on left side only. From D1 10.0 to D1 17.23 enlargement will be on right side only. This segment has no alternative route.

b. Alternate A (LC) begins at D1 17.23 and extends 0.60 miles up Tyronza Cutoff to LC 35.65, thence up Left Hand Chute Little River to LC 63.55, thence on up LHCLR to LC 67.75 (junction of Ditch 27 and Ditch 21A). While enlargement would be one-side-only, that could be either side (right-of-way decisions), except that work will be on the inside of all major bends. There will be no cutoffs.

c. Alternate B (KT) begins at D1 17.23=DT 17.23 and extends up Kochtitzky Ditch to KT 3[illegible].90, thence 0.85 miles west by a new diversion channel to LC 63.55, thence up [illegible]CLR to LC 67.75 (junction of Ditch 27 and Ditch 21A). From KT 17.23 to KT 19.00 enlargement will be on right side only; remainder may have work on either side.

3. Definitions

3.01. "Cultural resources" are defined to include any buildings, site, district, structure, object, data, or other material relating to the history, architecture, archeology, or culture of an area.

3.02. "Background and Literature Search" is defined as a comprehensive examination of existing literature and records for the purpose of inferring the potential presence and character of cultural resources in the study area. The examination may also serve as collateral information to field data in evaluating the eligibility of cultural resources for inclusion in the National Register of Historic Places or in amelionating losses of significant data in such resources.

3.03. "Intensive Survey" is defined as a comprehensive, systematic, and detailed on-the-ground survey of an area, of sufficient intensity to determine the number, types, extent and distribution of cultural resources present and their relationship to project features.

3.04. "Mitigation" is defined as the amelioration of losses of significant prehistoric, historic, or architectural resources which will be accomplished through preplanned actions to avoid, preserve, protect, or minimize adverse effect upon such resources or to recover a representative sample of the data they contain by implementation of scientific research and other professional techniques and procedures. Mitigation of losses of cultural resources includes, but is not limited to, such measures as: (1) recovery and preservation of an adequate sample of archaeological data to allow for analysis and published interpretation of the cultural and environmental conditions prevailing at the time(s) the area was utilized by man; (2) recording, through architectural quality photographs and/or measured drawings of buildings, structures, districts, sites and objects and deposition of such documentation in the Library of Congress as a part of the National Architectural and Engineering Record; (3) relocation of buildings, structures and objects; (4) modification of plans or authorized projects to provide for preservation of resources in place; (5) reduction or elimination of impacts by engineering solutions to avoid mechanical effects of wave wash, scour, sedimentation and related processes and the effects of saturation.

3.05. "Reconnaissance" is defined as an on-the-ground examination of selected portions of the study area, and related analysis adequate to assess the general nature of resources in the overall study area and the probable impact on resources of alternate plans under consideration. Normally reconnaissance will involve the intensive examination of not more than 15 percent of the total proposed impact area.

3.06. "Significance" is attributable to those cultural resources of historical, architectural, or archaeological value when such properties are included in or have been determined by the Secretary of the Interior to be eligible for

inclusion in the National Register of Historic Places after evaluation against the criteria contained in How to Complete National Register Forms.

3.07. "Testing" is defined as the systematic removal of the scientific, prehistoric, historic, and/or archaeological data that provide an archeological or architectual property with its research or data value. Testing may include controlled surface survey, shovel testing, profiling, and limited subsurface test excavations of the properties to be affected for purposes of research planning, the development of specific plans for research activities, excavation, the development of specific plans for research activities, preparation of notes and records, and other forms of physical removal of data and the material analysis of such data and material, preparation of reports on such data and material and dissemination of reports and other products of the research. Subsurface testing shall not proceed to the level of mitigation.

3.08. "Analysis" is the systematic examination of material data, environmental data, ethnographic data, written records, or other data which may be prerequisite to adequately evaluating those qualities of cultural loci which contribute to their significance.

4. General Performance Specifications

4.01. The Contractor shall prepare for each of the project areas a draft and final report detailing the results of the individual studies and subsequent recommendations.

4.02 Background and Literature Search

a. This task shall include an examination of the historic and prehistoric environmental setting and cultural background of the study area and shall be of sufficient magnitude to achieve a detailed understanding of the overall cultural and environmental context of the study area. It is axiomatic that the background and literature search shall normally preceed the initiation of all fieldwork.

b. Information and data for the literature search shall be obtained, as appropriate, from the following sources: (1) Scholarly reports - books, journals, theses, dissertations and unpublished papers; (2) Official Records - Federal, state, county and local levels, property deeds, public works and other regulatory department records and maps; (3) Libraries and Museums - both regional and local libraries, historical societies, universities, and museums; (4) Other repositories - such as private collections, papers, photographs, etc.; (5) archeological site files at local universities, the State Historic Preservation Office, the State Archeologist; (6) Consultation with qualified professionals familiar with the cultural resources in the area, as well as consultation with professionals in associated areas such as history, sedimentology, geomorphology, agronomy, and ethnology.

c. The Contractor shall include as an appendix to the draft and final reports written evidence of all consultation and any subsequent response(s), including the dates of such consultation and communications.

d. The background and literature search shall be performed in such a manner as to facilitate predictive statements (to be included in the study report) concerning the probable quantity, character, and distribution of cultural resources within the project area. In addition, information obtained in the background and literature search should be of such scope and detail as to serve as an adequate data base for subsequent field work and analysis in the study area undertaken for the purpose of discerning the character, distribution and significance of identified cultural resources.

e. In order to accomplish the objectives described in paragraph 4.02.d., it will be necessary to attempt to establish a relationship between landforms and the patterns of their utilization by successive groups of human inhabitants. This task should involve defining and describing various zones of the study area with specific reference to such variables as past topography, potential food resources, soils, geology, and river channel history.

4.03. Reconnaisance

a. The primary objective of the reconnaissance level investigation will be to assess the degree and extent of impact on cultural resources of the proposed project alternatives described in paragraph 2.02. The reconnaissance shall be of such a magnitude and nature as to provide predictive statements, to be included in the study report, concerning the numbers, types, and distribution of various cultural resources throughout the study area.

b Unless otherwise documented by the background and literature search, an underlying assumption guiding the formulation of the sampling design utilized in the reconnaissance level investigation is that sites are located relative to such variables as environmental features and that past cultures located their sites in adaptive relation to these variables. It is, therefore, axiomatic that sites are not distributed randomly across landscapes.

c. Unless a lesser fraction is determined by the Contracting Officer to be appropriate, the reconnaissance level investigation will examine a 15 percent sample of the entire project area. The project areas will be examined in two stages.

(1) Stage I reconnaissance - Up to 40 percent of the selected sample areas will be examined in Stage 1 reconnaisance.

(2) Stage II reconnaissance - In Stage II reconnaissance, the results of Stage I reconnaissance studies shall be analyzed in order to evaluate the suitability of the sampling design prior to the initiation of Stage II field work of the remaining sample fraction. Changes in such factors as data retreval techniques, statistical stratification and sample unit sizes, types or locations should be incorporated into any revision (if required) of the sampling design in order to more accurately assess the nature, quantity and distribution of cultural resources in the study area and the probable impacts of project alternatives on those resources.

d. The Contractor shall be required to submit a sampling design incorporating data gathered during the background and literature search for review and acceptance by the Contracting Officer before the initiation of the field survey. A second period of review will also be required before initiation of the Stage II survey. The text of the final sampling design shall be incorporated into the report of reconnaissance investigations.

The use of probability sampling procedures is highly encouraged. If such procedures are employed, the Contractor should excerise caution in insuring that it is possible, within the terms of this contract, to impliment the statistically valid sampling design submitted. Due consideration should be given, during the formulation of the sampling design, to such factors as vegital ground cover, landforms, probable weather conditions and the nature and extent of analysis and fieldwork necessary to arrive at supportable predictive statements concerning cultural resources in the project area. The sampling design should include a discussion of such factors as the types and sizes of sample units to be employed (ex: quadrats or transects) as well as the types of data retreval (ex: screened shovel units, surface observational units) to be used. Unless otherwise approved by the Contracting Officer, field data retreval techniques shall be consistent with paragraphs 4.03f. and 4.04b., c., g., and h., as appropriate, of this Scope of Work. The sampling design should also address the nature of planned sampling procedures (stratified proportional, stratified disproportional, systematic, etc.) and the rational(s) for their use in view of known data including that obtained in the background and literature search.

e. Data resulting from the reconnaissance shall be of a depth and quality allowing their incorporation into draft Environmental Impact Statements. The report of reconnaissance activities, consequently, shall discuss in general terms, recommendation for further study and testing and, where appropriate, the project cost and time requirements of legally mandated cultural resource studies of various proposed construction alternatives in the study area.

f. Site Specific Investigations. All cultural resources discovered within sample units/areas shall be examined by methods consistent with the following requirements:

(1) Site Boundaries

Horizontal site boundaries shall be derived by the use of surface observation procedures (where surface conditions are highly conducive to the observation of cultural evidence) or by screened shovel cut units or by a combination of these methods. The delineations of horizontal sites boundaries may be accomplished concurrently with the collection of other data consistent with paragraph 4.03f.(2). Site boundaries shall be related to a site datum and permanent reference point as described in paragraph 4.04c.

(2) Surface Data Retreval

Surface collection of the site area shall be accomplished in order to obtain data representative of total site surface content. Both historic and prehistoric items shall be collected. The Contractor shall carefully note and record

descriptions of surface conditions of the site including ground cover and the suitability of soil surfaces for detecting cultural items (ex: recent rainfall, standing water or mud). If ground surfaces are not highly conducive to surface collection, screened shovel test units shall be used to augment surface collection procedures.

Care should be taken to avoid bias in collecting certain classes of data or artifact types to the exclusion of others (ex: debitage or faunal remains) so as to insure that collections accurately reflect both the full range and the relative proportions of data classes present (ex: the proportion of debitage to implements or types of implements to each other). Such a collecting strategy shall require the total collection of quadrat or other sample units in sufficient quantities to reasonably assure that sample data are representative of such discrete site subareas as may exist. Since the number and placement of such sample units will depend, in part, on the subjective evaluation of intrasite variability, and the amount of ground cover, the Contractor shall describe, in the reconnaissance report, the rational for the number and distribution of collection units. In the event that the Contractor utilizes systematic sampling procedures in obtaining representative surface samples, care should be taken to avoid periodicity in recovered data. No individual sample unit type used in surface data collection shall exceed 36 square meters in area.

The Contractor shall undertake (in addition and subsequent to sample surface collecting) a general site collection in order to increase the sample size of certain classes of data which the Principal Investigator may deem prerequisite to an adequate site-specific and intersite evaluation of data.

As an alternative to surface collecting procedures discussed above, where surface visability is excellent, the Contractor may collect all visable artifacts. If such a procedure is undertaken, the precise proveniences of all individual artifacts shall be related to the primary site datum and recorded.

(3) Subsurface Data Retreval

Unless it can be conclusively and definitely demonstrated that no significant subsurface cultural resources occur at a site, the Contractor shall install a minimum of one 1 x 1 meter subsurface test unit to determine the presence and general nature of subsurface deposits.

g. Subsurface test units (other than shovel cut units) shall be excavated in levels no greater than 10 centimeters. Where cultural zonation or plow disturbance is present, however, excavated materials shall be removed by zones (and 10 cm. levels within zones where possible). Subsurface test units shall extend to a depth of at least 20 centimeters below artifact bearing soils. A portion of each test unit, measured from one corner (of a minimum 30 X 30 centimeters), shall be excavated to a depth of 40 centimeters below artifact bearing soils. All excavated material (including plow zone material) shall be screened using a minimum of ¼" hardware cloth. Representative profile drawings shall be made of excavated unit.

h. Stringent horizontal spatial control of site specific investigations will be maintained by relating the location of all collection and test units to the primary site datum.

i. Other types of subsurface units may, at the Contractor's option, be utilized in addition to those units required by this Scope of Work.

j. Subsurface investigations will be limited to testing and shall not proceed to the level of mitigation.

k. All test units (other than shovel cut units) excavated shall be backfilled by the Contractor.

4.04. Intensive Survey

a. Intensive Survey shall include the on-the-ground examination of the project areas described in paragraph 2.01 sufficiently to insure the location and preliminary evaluation of all cultural resources in the study area and to fulfill report requirements described for intensive survey in paragraph 5.03j.

b. Unless excellent ground visability and other conditions conducive to the observation of cultural evidence occurs, shovel test pits, or comparable subsurface excavation units, shall be installed at intervals no greater than 30 meters throughout the study area. Shovel test pits shall be minimally 30 x 30 centimeters in size and extend to a minimum depth of 50 centimeters. All such units shall be screened using ¼" mesh hardware cloth. Additional shovel test pits shall be excavated in areas judged by the Principal Investigator to display a high potential for the presence of cultural resources. If, during the course of intensive survey activities, areas are encountered in which disturbance or other factors clearly and decisively preclude the possible presence of significant cultural resources, the Contractor shall carefully examine and document the nature and extent of the factors and then proceed with survey activities in the remainder of the study area. Documentation and justification of such action shall appear in the survey report. The location of all shovel test units and surface observations shall be recorded and appear in the draft and final reports.

c. When cultural remains are encountered, horizontal site boundaries shall be derived by appropriate archaeological methods in such a manner as to allow precise location of site boundaries on Government project drawings and 7.5 minute U.S.G.S. quad maps when available. Methods used to establish site boundaries shall be discussed in the survey report together with the probable accuracy of the boundaries. The Contractor shall establish a datum at the discovered cultural loci which shall be precisely related to the site boundaries as well as to a permanent reference point (in terms of azimuth and distance). If possible, the permanent reference point used shall appear on Government blueline (project) drawings and/or 7.5 minute U.S.G.S. quad maps. If no permanent landmark is available, a permanent datum shall be established in a secure location for use as a reference point. The permanent datum shall be precisely plotted and shown on U.S.G.S. quad maps and project drawings. All descriptions of site location shall refer to the location of the primary site datum.

d. Upon approval of the Contracting Officer, the delineation of precise site boundaries may be deferred until the implementation of testing activities.

e. A non-collecting strategy, with regards to artifacts, is highly preferred at this level of investigation. If the Principal Investigator, however, believes it necessary to remove specific artifacts from their context in order to obtain data to fulfill requirements of this Scope of Work or to prevent the loss of these data, precise proveniences of all individual collected artifacts shall be observed, recorded and related to the primary site datum so that individual artifact proveniences can be readily and accurately pinpointed in subsequent controlled surface collection activity.

f. In any event, the Contractor shall examine all cultural resources encountered in the intensive survey sufficiently well to determine the approximate size, general nature and quantity of architectural or site surface data. Data collection shall be of sufficient scope to provide information requested on state site forms.

g. During the course of the intensive survey, the Contractor should observe and record local environmental, physiographic, geological or other variables (including estimates of ground visability and descriptions of soil characteristics) which may be useful in evaluating the effectiveness of survey procedures and providing comparative data for use in predictive statements which may be utilized in future Government cultural resource investigations.

h. When sites are not wholly contained within the right-of-way limits, the Contractor shall survey an area outside the right-of-way limits large enough to include the entire site within the survey area. This shall be done in an effort to delineate site boundaries and to determine the degree to which the site will be impacted.

4.05. Analysis and Curation. Unless otherwise indicated, artifactural and non-artifactural analysis shall be of an adequate level and nature to fulfill the requirements of this Scope of Work. All recovered cultural items shall be cataloged in a manner consistent with state requirements or standards of curation in the state in which the study occurs. The Contractor shall consult with appropriate state officials as soon as possible following the conclusion of fieldwork in order to obtain information (ex: accession numbers) prerequisite to such cataloging procedures. The Contractor shall have access to a depository for notes, photographs and artifacts (preferably in the state in which the study occurs) where they can be permanently available for study by qualified scholars. If such materials are not in Federal ownership, applicable state laws, if any, should be followed concerning the disposition of the materials after the completion of the final report. Efforts to insure the permanent curation of properly cataloged cultural resources materials in an appropriate institution shall be considered an integral part of the requirements of this Scope of Work.

5. General Report Requirements.

5.01. The primary purpose of the cultural resources report is to serve as a planning tool which aids the Government in meeting its obligations to preserve and protect our cultural heritage. The report will be in the form of a comprehensive, scholarly document that not only fulfills mandated legal requirements but also serves as a scientific reference for future cultural resources studies. As such, the report's content must be not only descriptive but also analytic in nature.

5.02. Upon completion of all field investigation and research, the Contractor shall prepare reports detailing the work accomplished, the results, the recommendations, and appropriate alternative mitigation measures, when required, for each project area. The format suggested by Guidelines for Contract Cultural Resource Survey Reports and Professional Qualifications as prepared by the Missouri Department of Natural Resources should be reviewed and, to the extent allowed by this Scope of Work utilized as an aid in preparing the required report.

5.03. The report shall include, but not necessarily be limited to, the following sections and items:

a. Title Page. The title page should provide the following information; the type of task undertaken, the cultural resources which were assessed (archeological, historical, architectural); the project name and location (county and state), the date of the report; the Contractor's name; the contract number; the name of the author(s) and/or the Principal Investigator; and the agency for which the report is being prepared.

b. Abstract. The abstract should include a summary of the number and types of resources which were surveyed, results of activities and the recommendations of the Principal Investigator.

c. Table of Contents.

d. Introduction. This section shall include the purpose of the report; a description of the proposed project; a map of the general area; a project map; and the dates during which the task was conducted. The introduction shall also contain the name of the institution where recovered materials will be curated.

e. Environmental Context. This section shall contain, but not be limited to, a discussion of probable past floral and faunal characteristics of the project area. Since data in this section may be used in the future evaluation of specific cultural resource significance, it is imperative that the quantity and quality of environmental data be sufficient to allow subsequent detailed analysis of the relationship between past cultural activities and environmental variables.

f. Previous Research. This section shall describe previous research which may be useful in deriving or interpreting relevant background research data, problem domains, or research questions and in providing a context in which to examine the probability of occurrence and significance of cultural resources in the study area.

g. Literature Search and Personal Interviews. This section shall discuss the results of the literature search, including specific data sources, and personal interviews which were conducted during the course of investigations.

h. Survey, Testing and Analytical Methods. This section shall contain an explicit discussion of research and/or survey strategy, and should demonstrate how environmental data, previous research data, the literature search and personal interviews have been utilized in constructing such a strategy.

i. Survey, Testing and Analytical Results. This section shall discuss archeological, architectural, and historical resources surveyed, tested and analyzed; the nature and results of analysis, and the scientific importance or significance of the work. Quantified listings and descriptions of artifacts and their proveniences may be included in this section or added to the report as an appendix. Inventoried sites shall include a site number.

j. Conclusions and Recommendations. This section shall contain the recommendations of the Principal Investigator regarding all contract activities. Recommendations in regard to reconnaissance level investigations of Ditch 1, Arkansas, should be at a level sufficient to accomplish the objectives described in paragraph 4.03. Conclusions derived from reconnaissance activities concerning the nature, quantity and distribution of cultural loci, should be used in describing the probable impact of project alternatives on cultural resources. Conclusions and recommendations concerning intensive survey activities should include an evaluation of predictive statements formulated in previous studies (ex: sample surveys) as well as an evaluation of predictive statements constructed prior to field work during the background and literature search.

k. References (American Antiquity style).

l. Appendices (Maps, correspondence, etc.). A copy of this Scope of Work shall be included as an appendix in all reports.

5.04. The above items do not necessarily have to be discrete sections; however, they should be readily discernable to the reader. The detail of the above items may vary somewhat with the purpose and nature of the study.

5.05. In order to prevent potential damage to cultural resources, no information shall appear in the body of the report which would reveal precise resource location. All maps which indicate or imply precise site locations shall be included in reports as a readily removable appendix (ex: envelope).

5.06. No logo or other such organizational designation shall appear in any part of the report (including tables or figures) other than the title page.

5.07. Unless specifically authorized by the Contracting Officer, all reports shall utilize permanent site numbers assigned by the state in which the study occurs.

5.08. All appropriate information (including typologies and other classificatory units) not generated in these contract activities shall be suitably referenced.

5.09. Reports detailing testing activities shall contain site specific maps. Site maps shall indicate site datum(s), location of data collection units (including shovel cuts, subsurface test units and surface collection units); site boundaries in relation to proposed project activities, site grid systems (where appropriate) and such other items as the Contractor may deem appropriate to the purposes of this contract.

5.10. Information shall be presented in textual, tabular, and graphic forms, whichever are most appropriate, effective and advantageous to communicate necessary information. All tables, figures and maps appearing in the report shall be of publishable quality.

5.11. Any abbreviated phrases used in the text shall be spelled out when the phase first occurs in the text. For example use "State Historic Preservation Officer (SHPO)" in the initial reference and thereafter "SHPO" may be used.

5.12. The first time the common name of a biological species is used it should be followed by the scientific name.

5.13. In addition to street addresses or property names, sites shall be located on the Universal Transverse Mercator (UTM) grid.

5.14. All measurements should be metric. If the Contractor's equipment is in the English system, then the metric equivalents should follow in parentheses.

5.15. As appropriate, diagnostic and/or unique artifacts, cultural resources or their contexts shall be shown by drawings or photographs.

5.16. Black and white photographs are preferred except when color changes are important for understanding the data being presented. No instant type photographs may be used.

5.17. Negatives of all black and white photographs and/or color slides of all plates included in the final report shall be submitted so that copies for distribution can be made.

6. Submittals.

6.01. A brief management summary describing the approximate size and general nature of all cultural resources detected shall be supplied to the Contracting Officer within 10 days of the completion of intensive survey field activity.

6.02. The Contractor shall submit 10 copies of the draft reports and one original and 50 bound copies each of the final reports which include appropriate revisions in response to the Contracting Officer's comments.

6.03. The Contractor shall submit under separate cover 6 copies of appropriate 15' quadrangle maps (7.5' when available) and other site drawings which show exact boundaries of all cultural resources within the project area and their relationship to project features, and single copies of all forms, records and photographs described in paragraph 1.04.

6.04. The Contractor shall submit to the Contracting Officer completed National Register forms including photographs, maps, and drawings in accordance with the National Register Program if any sites inventoried during the survey are found to meet the criteria of eligibility for nomination and for determination of significance. The completed National Register forms are to be submitted with the final report.

6.05. At any time during the period of service of this contract, upon the written request of the Contracting Officer, the Contractor shall submit, within 30 calendar days, any portion or all field records described in paragraph 1.04 without additional cost to the Government.

6.06. When cultural resources are located during reconnaissance or intensive survey activities, the Contractor shall supply the appropriate State Historic Preservation Office with completed site forms, survey report summary sheets, maps or other forms as appropriate. Blank forms may be obtained from the State Historic Preservation Office. Copies of such completed forms and maps shall be submitted to the Contracting Officer within 30 calendar days of the end of fieldwork.

6.07. The Contactor shall prepare and submit with the final report, a site card for each identified resource or aggregate resource. These site cards do not replace state approved prehistoric, historic, or architectural forms or Contractor designed forms. This site card shall contain the following information, to the degrees permitted by the type of study authorized:

a. site number

b. site name

c. location: section, township, and UTM coordinates (for procedures in determining UTM coordinates, refer to How to Complete National Register Forms, National Register Program, Volume 2.

d. county and state

e. quad maps

f. date of record

g. description of site

h. condition of site

i. test excavation results

j. typical artifacts

k. chronological position (if known)

l. relation to project

m. previous studies and present contract number

n. additional remarks

7. Schedule

7.01. The Contractor shall, unless delayed due to causes beyond his control and without his fault or negligence, complete all work and services under this contract within the following time limitations.

Activity	Due Date (Beginning with acknowledged date of receipt of notice to proceed)
Submittal of initial sampling strategy for Reconnaissance of Ditch 1, Arkansas	30 calendar days
Intensive Survey of Belle Fountain Ditch and Tributaries Arkansas and Missouri	100 calendar days
Reconnaissance of Ditch 1, Arkansas	116 calendar days
Submittal of Draft Report	270 calendar days
Government Review of Draft Reports	300 calendar days
Contractor's Submittal of Final Reports	360 calendar days

7.02. The Contractor shall make any required corrections after review by the Contracting Officer of the reports. In the event that any of the Government review periods are exceeded and upon request of the Contractor, the contract period will be extended on a calendar day for day basis. Such extension shall be granted at no additional cost to the Government.

8. Payment.

8.01. Estimates shall be made monthly of the amount and value of the work and services performed by the Contractor under this contract, such estimates to be prepared by the Contractor and accompanied by such supporting data as may be required by the Contracting Officer.

8.02. Invoices shall be submitted monthly for payment on ENG Form 93, Payment Estimate - Contract Performance, in quadruplicate for the amount and value of the work and services performed by the Contractor. Upon approval of such invoices by the Contracting Officer, payment shall be made to the Contractor as soon as practicable of 90% of the invoiced amount. A retained percentage of 10% will be applied to each invoiced amount. If the Contracting Officer determines that the work is substantially complete and that the amount of retained percentages is in excess of the amount considered by him to be adequate for the protection of the Government, he may at his discretion release to the Contractor such excess amount.

8.03. Upon satisfactory completion by the Contractor and acceptance by the Contracting Officer of the work done by the Contractor in accordance with the provisions of this contract, the Contractor will be paid the unpaid balance of any money due for work under said statement, including retained percentages relating to this portion of the work.

8.04. Prior to such final payment under the contract, or prior to settlement upon termination of the contract, and as a condition precendent thereto, the Contractor shall execute and deliver to the Contracting Officer a release of all claims against the Government arising under or by virtue of this contract, other than such claims, if any, as may be specifically excepted by the Contractor from the operation of the release in stated amounts to be set forth therein.

PART II - SECTION I - GENERAL PROVISIONS

Standard Service Contract Provisions, "General Provisions (Service Contract)" 11 August 1980 edition, revised through 23 Apr 82, Index and 47 pages, receipt of a copy of which is acknowledged by the offeror, are incorporated herein and made a part hereof.

48. Alterations. The following alterations have been made in the General Provisions of the contract. Clause 5 of the General Provisions has been deleted and Clauses 49, 50, 51, 52, 53, 54, and 55 have been added.

49. Clause 5, "Payments," of the General Provisons is deleted and the "Payment" clause listed in Section C, paragraph 8, Page C-18 is substituted therefor.

50. CONTRACTING OFFICER'S DECISIONS. The extent and character of the work and services performed by the Contractor shall be subject to the general supervision, direction, control, and approval of the Contracting Officer to whom the Contractor shall report and be responsible. In the event that there shall be any dispute with regard to the extent and character of the work to be done, the decision of the Contracting Officer shall govern, but the Contractor shall have the right to appeal as provided in the "Disputes" clause.

51. RIGHTS IN TECHNICAL DATA AND COMPUTER SOFTWARE (1979 MAR)

(a) Definitions.

(1) Technical Data means recorded information, regardless of form or characteristic, of a scientific or technical nature. It may, for example, document research, experimental, developmental or engineering work; or be usable or used to define a design or process or to procure, produce, support, maintain, or operate material. The data may be graphic or pictorial delineations in media such as drawings or photographs; text in specifications or related performance or design type documents; or computer printouts. Examples of technical data include research and engineering data, engineering drawings and associated lists, specifications, standards, process sheets, manuals, technical reports, catalog item identifications and related information and computer software documentation. Technical data does not include computer software or financial, administrative, cost and pricing, and management data or other information incidental to contract administration.

(2) Computer - a data processing device capable of accepting data, performing prescribed operations on the data, and supplying the results of these operations; for example, a device that operates on discrete data by performing arithmetic and logic processes on these data, or a device that operates on analog data by performing physical processes on the data.

(3) Computer Software - computer programs and computer data bases.

(4) Computer Program - a series of instructions or statements in a form acceptable to a computer, designed to cause the computer to execute an operation or operations. Computer programs include operating systems, assemblers, compilers, interpreters, data management systems, utility programs, sort-merge programs, and ADPE maintenance/diagnostic programs, as well as applications programs such as payroll, inventory control, and engineering analysis programs. Computer programs may be either machine-dependent or machine-independent, and may be general purpose in nature or designed to satisfy the requirements of a particular user.

(5) Computer Data Base - a collection of data in a form capable of being processed and operated on by a computer.

(6) Computer Software Documentation - Technical data, including computer listings and printouts, in human-readable form which (i) documents the design of details of computer software, (ii) explains the capabilities of the software, or (iii) provides operating instructions for using the software to obtain desired results from a computer.

(7) Unlimited Rights means rights to use, duplicate, or disclose technical data or computer software in whole or in part, in any manner and for any purpose whatsoever, and to have or permit others to do so.

(8) Limited Rights means rights to use, duplicate, or disclose technical data, in whole or in part, by or for the Government, with the express limitation that such technical data shall not, without the written permission of the party furnishing such technical data be (a) released or disclosed in whole or in part outside the Government, (b) used in whole or in part by the Government for manufacture, or in the case of computer software documentation, for preparing the same or similar computer software, or (c) used by a party other than the Government, except for:

(i) emergency repair or overhaul work only, by or for the Government, where the item or process concerned is not otherwise reasonably available to enable timely performance of the work, provided that the release or disclosure thereof outside the Government shall be made subject to a prohibition against further use, release or disclosure; or

(ii) release to a foreign government, as the interest of the United States may require, only for information or evaluation within such government or for emergency repair or overhaul work by or for such government under the conditions of (i) above.

(9) Restricted Rights apply only to computer software, and include, as a minimum, the right to:

(i) use computer software with the computer for which or with which it was acquired, including use at any Government installation to which the computer may be transferred by the Government;

(ii) use computer software with a backup computer if the computer for which or with which it was acquired is inoperative;

(iii) copy computer programs for safekeeping (archives) or backup purposes;

(iv) modify computer software, or combine it with other software, subject to the provision that those portions of the derivative software incorporating restricted rights software are subject to the same restricted rights

In addition, any other specific rights not inconsistent therewith listed or described in this contract or described in a license or agreement made a part of this contract.

(b) Government Rights.

(1) Unlimited Rights. The Government shall have unlimited rights in:

(i) technical data and computer software resulting directly from performance of experimental, developmental or research work which was specified as an element of performance in this or any other Government contract or subcontract;

(ii) computer software required to be originated or developed under a Government contract, or generated as a necessary part of performing a contract;

(iii) computer data bases, prepared under a Government contract, consisting of information supplied by the Government, information in which the Government has unlimited rights, or information which is in the public domain.

(iv) technical data necessary to enable manufacture of end-items, components, modifications or processes have been, or are being, developed under this or any other Government contract or subcontract in which experimental, developmental or research work is, or was specified as an element of contract performance, except technical data pertaining to items, components, processes, or computer software developed at private expense (but see (2)(ii) below);

(v) technical data or computer software prepared or required to be delivered under this or any other Government contract or subcontract and constituting corrections or changes to Government-furnished data or computer software;

(vi) technical data pertaining to end-items, components or processes, prepared or required to be delivered under this or any other Government contract or subcontract, for the purpose of identifying sources, size, configuration, mating and attachment characteristics, functional characteristics and performance requirements ("form, fit and function" data, e.g., specification control drawings, catalog sheets, envelope drawings, etc.);

(vii) manuals or instructional materials prepared or required to be delivered under this contract or any subcontract hereunder for installation, operation, maintenance or training purposes;

(viii) technical data or computer software which is in the public domain, or has been or is normally furnished without restriction by the Contractor or subcontractor; and

(ix) technical data or computer software listed or described in an agreement incorporated into the schedule of this contract which the parties have predetermined, on the basis of subparagraphs (i) through (viii) above, and agreed will be furnished with unlimited rights.

(2) Limited Rights. The Government shall have limited rights in:

(i) technical data, listed or described in an agreement incorporated into the Schedule of this contract, which the parties have agreed will be furnished with limited rights; and

(ii) unpublished technical data pertaining to items, components or processes developed at private expense, and unpublished computer software documentation related to computer software that is acquired with restricted rights, other than such data as may be included in the data referred to in (b)(1)(i), (v),(vi), (vii); and (viii); provided that only the portion or portions of each piece of data to which limited rights are to be asserted pursuant to (2)(i) and (ii) above are identified (for example, by circling, underscoring, or a note), and that the piece of data is marked with the legend below in which it is inserted:

A. the number of the prime contract under which the technical data is to be delivered.

B. the name of the Contractor and any subcontractor by whom the technical data was generated, and

C. an explanation of the method used to identify limited rights data.

LIMITED RIGHTS LEGEND

Contract No.....
Contractor.....
Explanation of Limited Rights Data Identification Method Used

.....	.....	.....	.....
.....	.....	.....	.....

Those portions of this technical data indicated as limited rights data shall not, without the written permission of the above Contractor be either (a) used, released or disclosed in whole or in part outside the Government, (b) used in

whole or in part by the Government for manufacture or, in the case of computer software documentation, for preparing the same or similar computer software, or (c) used by a party other than the Government, except for: (i) emergency repair or overhaul work only, by or for the Governemnt, where the item or process concerned is not otherwise reasonably available to enable timely performance of the work, provided that the release or disclosure hereof outside the Government shall be made subject to a prohibition against further use, release or disclosure; or (ii) release to a foreign government, as the interest of the United States may require, only for information or evaluation within such government or for emergency repair or overhaul work by or for such government under the conditions of (i) above. This legend, together with the indications of the portions of this data which are subject to such limitations shall be included on any reproduction hereof which includes any part of the portions subject to such limitations.

(3) Restricted Rights. The Government shall have restricted rights in computer software, listed or described in a license or agreement made a part of this contract, which the parties have agreed will be furnished with restricted rights, provided, however, notwithstanding any contrary provisions in any such license or agreement, the Government shall have the rights in (a)(9)(i) through (v). Such restricted rights are of no effect unless the computer software is marked by the Contractor with the following legend:

RESTRICTED RIGHTS LEGEND

Use, duplication or disclosure is subject to
restrictions stated in Contract No. . . . . .
with. . . . . .(Name of Contractor)

and the related computer software documentation includes a prominent statement of the restrictions applicable to the computer software. The Contractor may not place any legend on computer software indicating restrictions on the Government's rights in such software unless the restrictions are set forth in a license or agreement made a part of this contract prior to the delivery data of the software. Failure of the Contractor to apply a restricted rights legend to such computer software shall relieve the Government of a liability with respect to such unmarked software.

(4) No legend shall be marked on, nor shall any limitation or restriction on rights of use be asserted as to, any data or computer software which the Contractor has previously delivered to the Government without restriction. The limited or restricted rights provided for by this paragraph shall not impair the right of the Government to use similar or identical data or computer software acquired from other sources.

(c) Copyright.

(1) In addition to the rights granted under the provisions of (b) above, the Contractor hereby grants to the Government a nonexclusive, paid-up license throughout the world, of the scope set forth below, under any copyright owned by the Contractor, in any work of authorship prepared for or acquired by the Government under this contract, to reproduce the work in copies or phonorecords, to distribute copies or phonorecords to the public, to perform or display the work publicly, and to prepare derivative works thereof, and to have others do so for Government purposes. With respect to technical data and computer software in which the Government has unlimited rights, the license shall be of the same scope as the rights defined in (a)(7). With respect to technical data in which the Government has limited rights, the scope of the license is limited to the rights defined in (a)(8). With respect to computer software which the parties have agreed in accordance with (b)(3) will be furnished with restricted rights, the scope of the license is limited to such rights.

(2) Unless written approval of the Contracting Officer is obtained, the Contractor shall not include in technical data or computer software prepared for or acquired by the Government under this contract any works of authorship in which copyright is not owned by the Contractor without acquiring for the Government any rights necessary to perfect a copyright license of the scope specified in (c)(1).

(3) As between the Contractor and the Government, the Contractor shall be considered for "person for whom the work was prepared" for the purpose of determining authorship under Section 201(b) of Title 17, United States Code.

(4) Technical data delivered under this contract which carries a copyright notice shall also include the following statement which shall be placed thereon by the Contractor, or should the Contractor fail, by the Government:

> This material may be reproduced by or for the U.S. Government pursuant to the copyright license under DAR clause 7-104.9(a)(date).

(d) Removal of Unauthorized Markings. Notwithstanding any provision of this contract concerning inspection and acceptance, the Government may correct, cancel, or ignore any marking not authorized by the terms of this contract on any technical data or computer software furnished hereunder, if:

(i) the Contractor fails to respond within sixty (60) days to a written inquiry by the Government concerning the propriety of the markings, or:

(ii) The Contractor's response fails to substantiate, within sixty (60) days after written notice, the propriety of limited rights markings by clear and convincing evidence, or of restricted rights markings by identification of the restrictions set forth in the contract.

In either case the Government shall give written notice to the Contractor of the action taken.

(e) Relation to Patents. Nothing contained in this clause shall imply a license to the Government under any patent or be construed as affecting the scope of any license or other right otherwise granted to the Government under any patent.

(f) Limitation on Charges for Data and Computer Software. The Contractor recognizes that the Government or a foreign government with funds derived through the Military Assistance Program or otherwise through the United States Government may contract for property or services with respect to which the vendor may be liable to the Contractor for charges for the use of technical data or computer software on account of such a contract. The Contractor further recognizes that it is the policy of the Government not to pay in connection with its contracts, or to allow to be paid in connection with contracts made with funds derived through the Military Assistance Program or otherwise through the United States Government, charges for data or computer software which the Government has a right to use and disclose to others, which is in the public domain, or which the Government has been given without restrictions upon its use and disclosure to others. This policy does not apply to reasonable reproduction,handling, mailing, and similar administrative costs incident to the furnishing of such data or computer software. In recognition of this policy, the Contractor agrees to participate in and make appropriate arrangements for the exclusion of such charges from such contracts or for the refund of amounts received by the Contractor with respect to any such charges not so excluded.

(g) Acquisition of Data and Computer Software from Subcontractors.

(1) Whenever any technical data or computer software is to be obtained from a subcontractor under this contract, the Contractor shall use this same clause in the subcontract, without alteration and no other clause shall be used to enlarge or diminish the Government's or the Contractor's rights in that subcontractor data or computer software which is required for the Government.

(2) Technical data required to be delivered by a subcontractor shall normally be delivered to the next-higher tier Contractor. However, when there is a requirement in the prime contract for data which may be submitted with limited rights pursuant to (b)(2) above, a subcontractor may fulfill such requirement by submitting such data directly to the Government rather than through the prime Contractor.

(3) The Contractor and higher-tier subcontractors will not use their power to award subcontracts as economic leverage to acquire rights in technical data or computer software from their subcontracts for themselves. (DAR 7-104.9).

(h)(1) Unless the schedule provides otherwise, and subject to (2) below, the Contractor will promptly notify the Contracting Officer in writing of the intended use by the Contractor or subcontractor in performance of this contract of any item, component or process for which technical data would fall within paragraph (b)(2) above.

(2) Such notification is not required with respect to:

(i) standard commercial items which are manufactured by more than one source of supply, or:

(ii) items, components or processes for which such notice was given pursuant to predetermination of rights in technical data in connection with this contract.

(3) Contracting Officer approval is not necessary under this clause for the Contractor to use the item, component or process in the performance of the contract. (1972 APR)

52. ACCIDENT PREVENTION (1981 AUG)

(a) In order to provide safety controls for protection to the life and health of the employees and other persons; for prevention of damage to property, materials, supplies, and equipment; and for avoidance of work interruptions in the performance of this contract, the Contractor shall comply with all pertinent provisions of Corps of Engineers Manual, EM-385-1-1, dated 1 April 1981, entitled "Safety and Health Requirements," and will also take care or cause to be taken such additional measures as the Contracting Officer may determine to be reasonably necessary for the purpose.

(b) The Contractor will maintain an accurate record of, and will report to the Contracting Officer in the manner and on the forms prescribed by the Contracting Officer, exposure data and all accidents resulting in death, traumatic injury, occupational disease, and damage to property, materials, supplies and equipment incident to work performed under this contract.

(c) The Contracting Officer will notify the Contractor of any noncompliance with the foregoing provisions and the action to be taken. The Contractor shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the Contractor or his representative at the site of the work, shall be deemed sufficient for the purpose. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

(d) Compliance with the provisions of this clause by sub-contractors will be the responsibility of the Contractor. (DAR 7-602.42(a))

53. SUBCONTRACTORS AND OUTSIDE ASSOCIATES AND CONSULTANTS (1965 JAN) Any subcontractors and outside associates or consultants required by the Contractor in connection with the services covered by the contract will be limited to such individuals or firms as were specifically identified and agreed to during negotiations. Any substitution in such subcontractors, associates, or consultants will be subject to the prior approval of the Contracting Officer. (DAR 7-607.16)

54. FAIR LABOR STANDARDS ACT AND SERVICE CONTRACT ACT - PRICE ADJUSTMENT (1979 SEP)

(a) The Contractor warrants that the prices set forth in this contract do not include any allowance for any contingency to cover increased cost for which adjustment is provided under this clause.

(b) When as a result of an increased or decreased wage determination applied to this contract by operation of law or an amendment to the Fair Labor Standards Act of 1938, as amended (29 U.S.C. 201 et. seq.), enacted subsequent to award of this contract, affecting the minimum wage, which becomes applicable to this contract under law, the Contractor increases or decreases wages or fringe benefits of employees working on this contract to comply therewith, the contract price or contract unit price labor rates will be adjusted to reflect such increases or decreases. Any such adjustment will be limited to increases or decreases in wages or fringe benefits as described above, and the concomitant increases or decreases in social security and umeployment taxes and workmen's compensation insurance, but shall not otherwise include any amount for general and administrative costs, overhead, or profits.

(c) The Contractor shall notify the Contracting Officer of any increases claimed under this clause within thirty (30) days after the effective date of the wage change, unless this period is extended by the Contracting Officer in writing. In the case of any decrease under this clause, the Contractor shall promptly notify the Contracting Officer of such decrease but nothing herein shall preclude the Government from asserting a claim within the period permitted by law. The notice shall contain a statement of the amount claimed and any other relevant data in support thereof, which may reasonably be required by the Contracting Officer. Upon agreement of the parties, the contract price or contract unit price labor rates shall be modified in writing. Pending agreement on or determination of, any such adjustment and its effective date, the Contractor shall continue performance.

55. CONTINUING CONTRACT (1978 MAR OCE)

(a) Funds are not available at the inception of this contract to cover the entire contract price. The sum of $50,000.00 has been reserved for this contract and is available for payments to the Contractor during the current fiscal year. It is expected that Congress will make appropriations for future fiscal years from which additional funds will be reserved for this contract. The liability of the United States for payments beyond the funds reserved for this contract is contingent on the reservation of additional funds.

(b) Failure to make payments in excess of the amount currently reserved, or that may be reserved from time to time, shall not be considered a breach of this contract, and shall not entitle the Contractor to a price adjustment under the terms of this contract except as specifically provided in paragraphs (d) and (e) below.

(c)(1) The Government may at any time reserve additional funds for payments under the contract if there are funds available for such purpose. The Contracting Officer will promptly notify the Contractor in writing of any additional funds reserved for the contract.

(2) If earnings will be such that funds reserved for the contract will be exhausted before the end of any fiscal year, the Contractor shall give written notice to the Contracting Officer of the estimated date of exhaustion and the amount of additional funds which will be needed to meet payments due or to become due under the contract during that fiscal year. This notice shall be given not less than 45 nor more than 60 days prior to the estimated data of exhaustion.

(d)(1) No payments will be made after exhaustion of funds except to the extent that additional funds are reserved for the contract. If and when sufficient additional funds are reserved, the Contractor shall be entitled to simple interest on any payment that the Contracting Officer determines was actually earned under the terms of the contract and would have been made except for exhaustion of funds. Interest shall be computed from the time such payment would otherwise have been made until actually or constructively made, and shall be at the rate established by the Secretary of the Treasury pursuant to Public Law 92-41, 85 Stat 97, for the Renegotiation Board, as in effect on the first day of the delay in such payment.

(2) After suspension, delay, or interruption of work arising from exhaustion or anticipated exhaustion of funds shall not constitute a breach of this contract and shall not entitle the Contractor to any price adjustment under a "Suspension or Work" or similar clause of in any other manner under this contract.

(3) An equitable adjustment in performance time shall be made for any increase in the time required for performance of any part of the work arising from exhaustion of funds or the reasonable anticipation of exhaustion of funds.

(e) If, upon the expiration of sixty (60) days after the beginning of the fiscal year following an exhaustion of funds, the Government has failed to reserve sufficient additional funds to cover payments otherwise due, the Contractor, by written notice delivered to the Contracting Officer at any time before such additional funds are reserved, may elect to treat his right to proceed with the work as having been terminated. Such a termination shall be at no cost to the Government, except that, to the extent that additional funds to make payment therefor are allocated to this contract, it may be treated as a termination for the convenience of the Government.

(f) If at any time it becomes apparent that the funds reserved for any fiscal year are in excess of the funds required to meet all payments due or to become due the Contractor because of work performed and to be performed under the contract during the fiscal year, the Government reserves the right, after notice to the Contractor, to reduce said reservation by the amount of such excess.

(g) The term "Reservation" means monies that have been set aside and made available for payment under this contract.

SECTION J - LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS

DD Form 1707, Information to Offerors or Quoters, 1 Feb 76, 2 pages
Standard Form 33, Part 1, Solicitation, Offer, and Award (Rev. 3-77) 1 page
Standard Form 33, Part 2, Representations, Certifications and Acknowledgments, (Rev. 3-77), 6 pages
Standard Form 33A, Solicitation Instructions and Conditions, (Rev. 1-78), 6 pages
General Provisions (Service Contract) 11 Aug 80 Edition, revised thru 23 APR 82, Index and 47 pages
Statement of Equivalent Rates for Federal Hires, 2 pages

SECTION L

SOLICITATION INSTRUCTIONS AND CONDITIONS

1. DEFINITIONS.

As used herein:

(a) The term "solicitation" means Invitation for Bids (IFB) where the procurement is advertised, and Request for Proposal (RFP) where the procurement is negotiated.

(b) The term "offer" means bid where the procurement is advertised, and proposal where the procurement is negotiated.

(c) For purposes of this solicitation and Block 2 of Standard Form 33, the term "advertised" includes Small Business Restricted Advertising and other types of restricted advertising.

2. PREPARATION OF OFFERS.

(a) Offerors are expected to examine the drawings, specifications, Schedule, and all instructions. Failure to do so will be at offeror's risk.

(b) Each offeror shall furnish the information required by the solicitation. The offeror shall sign the solicitation and print or type his name on the Schedule and each Continuation Sheet thereof on which he makes an entry. Erasures or other changes must be initialed by the person signing the offer. Offers signed by an agent are to be accompanied by evidence of his authority unless such evidence has been previously furnished to the issuing office.

(c) Unit price for each unit offered shall be shown and such price shall include packing unless otherwise specified. A total shall be entered in the Amount column of the Schedule for each item offered. In case of discrepancy between a unit price and extended price, the unit price will be presumed to be correct, subject, however, to correction to the same extent and in the same manner as any other mistake.

(d) Offers for supplies or services other than those specified will not be considered unless authorized by the solicitation.

(e) Offeror must state a definite time for delivery of supplies or for performance of services unless otherwise specified in the solicitation.

(f) Time, if stated as a number of days, will include Saturdays, Sundays and holidays.

(g) Code boxes are for Government use only.

3. EXPLANATION TO OFFERORS. Any explanation desired by an offeror regarding the meaning or interpretation of the solicitation, drawings, specifications, etc., must be requested in writing and with sufficient time allowed for a reply to reach offerors before the submission of their offers. Oral explanations or instructions given before the award of the contract will not be binding. Any information given to a prospective offeror concerning a solicitation will be furnished to all prospective offerors as an amendment of the solicitation, if such information is necessary to offerors in submitting offers on the solicitation or if the lack of such information would be prejudicial to uninformed offerors.

4. ACKNOWLEDGMENT OF AMENDMENTS TO SOLICITATIONS. Receipt of an amendment to a solicitation by an offeror must be acknowledged (a) by signing and returning the amendment, (b) on page three of Standard Form 33, or (c) by letter or telegram. Such acknowledgment must be received prior to the hour and date specified for receipt of offers.

5. SUBMISSION OF OFFERS.

(a) Offers and modifications thereof shall be enclosed in sealed envelopes and addressed to the office specified in the solicitation. The offeror shall show the hour and date specified in the solicitation for receipt, the solicitation number, and the name and address of the offeror on the face of the envelope.

(b) Telegraphic offers will not be considered unless authorized by the solicitation; however, offers may be modified or withdrawn by written or telegraphic notice, provided such notice is received prior to the hour and date specified for receipt. (However, see paragraphs 7 and 8.)

(c) Samples of items, when required, must be submitted within the time specified, and unless otherwise specified by the Government, at no expense to the Government. If not destroyed by testing, samples will be returned at offeror's request and expense, unless otherwise specified by the solicitation.

6. FAILURE TO SUBMIT OFFER. If no offer is to be submitted, do not return the solicitation unless otherwise specified. A letter or postcard shall be sent to the issuing office advising whether future solicitations for the type of supplies or services covered by this solicitation are desired. Failure of the recipient to offer, or to notify the issuing office that future solicitations are desired, may result in removal of the name of such recipient from the mailing list for the type of supplies or services covered by the solicitation.

7. LATE BIDS, MODIFICATIONS OF BIDS, OR WITHDRAWAL OF BIDS. (See Page L-3, Paragraph L-20a)

(a) ~~Any bid received at the office designated in the solicitation after~~ the exact time specified for receipt will not be considered unless it is received before award is made and either:

(1) It was sent by registered or certified mail not later than the fifth calendar day prior to the date specified for the receipt of bids (e.g., a bid submitted in response to a solicitation requiring receipt of bids by the 20th of the month must have been mailed by the 15th or earlier); or

(2) It was sent by mail (or telegram if authorized) and it is determined by the Government that the late receipt was due solely to mishandling by the Government after receipt at the Government installation.

(b) Any modification or withdrawal of a bid is subject to the same conditions as in (a), above. A bid may also be withdrawn in person by a bidder or his authorized representative, provided his identity is made known and he signs a receipt for the bid, but only if the withdrawal is made prior to the exact time set for receipt of bids.

(c) The only acceptable evidence to establish:

(1) The date of mailing of a late bid, modification, or withdrawal sent either by registered or certified mail is the U.S. Postal Service postmark on both the envelope or wrapper and on the original receipt from the U.S. Postal Service. If neither postmark shows a legible date, the bid, modification, or withdrawal shall be deemed to have been mailed late. (The term "postmark" means a printed, stamped, or otherwise placed impression (exclusive of a postage meter machine impression) that is readily identifiable without further action as having been supplied and affixed on the date of mailing by employees of the U.S. Postal Service. Therefore, offerors should request the postal clerk to place a hand cancellation bull's-eye "postmark" on both the receipt and the envelope or wrapper.)

(2) The time of receipt at the Government installation is the time-date stamp of such installation on the bid wrapper or other documentary evidence of receipt maintained by the installation.

(d) Notwithstanding (a) and (b) of this provision, a late modification of an otherwise successful bid which makes its terms more favorable to the Government will be considered at any time it is received and may be accepted.

Note: The term "telegram" includes mailgrams.

8. LATE PROPOSALS, MODIFICATIONS OF PROPOSALS, AND WITHDRAWALS OF PROPOSALS.

(a) Any proposal received at the office designated in the solicitation after the exact time specified for receipt will not be considered unless it is received before award is made, and:

(1) It was sent by registered or certified mail not later than the fifth calendar day prior to the date specified for receipt of offers (e.g., an offer submitted in response to a solicitation requiring receipt of offers by the 20th of the month must have been mailed by the 15th or earlier);

(2) It was sent by mail (or telegram if authorized) and it is determined by the Government that the late receipt was due solely to mishandling by the Government after receipt at the Government installation; or

(3) It is the only proposal received.

(b) Any modification of a proposal, except a modification resulting from the Contracting Officer's request for "best and final" offer, is subject to the same conditions as in (a)(1) and (a)(2) of this provision.

(c) A modification resulting from the Contracting Officer's request for "best and final" offer received after the time and date specified in the request will not be considered unless received before award and the late receipt is due solely to mishandling by the Government after receipt at the Government installation.

(d) The only acceptable evidence to establish:

(1) The date of mailing of a late proposal or modification sent either by registered or certified mail is the U.S. Postal Service postmark on both the envelope or wrapper and on the original receipt from the U.S. Postal Service. If neither postmark shows a legible date, the proposal or modification shall be deemed to have been mailed late. (The term "postmark" means a printed, stamped, or otherwise, placed impression (exclusive of a postage meter machine impression) that is readily identifiable without further action as having been supplied and affixed on the date of mailing by employees of the U.S. Postal Service. Therefore, offerors should request the postal clerk to place a hand cancellation bull's-eye "postmark" on both the receipt and the envelope or wrapper.)

(2) The time of receipt at the Government installation is the time-date stamp of such installation on the proposal wrapper or other ~~documentary evidence of receipt maintained by the installation.~~

(e) ~~Notwithstanding (a), (b), and (c), of this provision, a late~~ modification of an otherwise successful proposal which makes its terms more favorable to the Government will be considered at any time it is received and may be accepted.

(f) Proposals may be withdrawn by written or telegraphic notice received at any time prior to award. Proposals may be withdrawn in person by an offeror or his authorized representative, provided his identity is made known and he signs a receipt for the proposal prior to award.

Note: The term "telegram" includes mailgrams.

~~Note: The alternate late proposals, modifications of proposals and withdrawals of proposals provision prescribed by 41 CFR 1-3.802-2(b) shall be used in lieu of provision 8, if specified by the contract.~~

9. DISCOUNTS.

(a) Notwithstanding the fact that a blank is provided for a ten (10) day discount, prompt payment discounts offered for payment within less than twenty (20) calendar days will not be considered in evaluating offers for award, unless otherwise specified in the solicitation. However, offered discounts of less than 20 days will be taken if payment is made within the discount period, even though not considered in the evaluation of offers. (See Page L-4, Paragraph L-20b)

~~(b) In connection with any discount offered, time will be computed~~ from date of delivery of the supplies to carrier when delivery and acceptance are at point of origin, or from date of delivery at destination or port of embarkation when delivery and acceptance are at either of those points, or from the date correct invoice or voucher is received in the office specified by the Government, if the latter date is later than date of delivery. Payment is deemed to be made for the purpose of earning the discount on the date of mailing of the Government check.

10. AWARD OF CONTRACT.

(a) The contract will be awarded to that responsible offeror whose offer conforming to the solicitation will be most advantageous to the Government, price and other factors considered.

(b) The Government reserves the right to reject any or all offers and to waive informalities and minor irregularities in offers received.

(c) The Government may accept any item or group of items of any offer, unless the offeror qualifies his offer by specific limitations. UNLESS OTHERWISE PROVIDED IN THE SCHEDULE, OFFERS MAY BE SUBMITTED FOR ANY QUANTITIES LESS THAN THOSE SPECIFIED; AND THE GOVERNMENT RESERVES THE RIGHT TO MAKE AN AWARD ON ANY ITEM FOR A QUANTITY LESS THAN THE QUANTITY OFFERED AT THE UNIT PRICES OFFERED UNLESS THE OFFEROR SPECIFIES OTHERWISE IN HIS OFFER.

(d) A written award (or Acceptance of Offer) mailed (or otherwise furnished) to the successful offeror within the time for acceptance specified in the offer shall be deemed to result in a binding contract without further action by either party.

The following paragraphs (e) through (h) apply only to negotiated solicitations:

(e) The Government may accept within the time specified therein, any offer (or part thereof, as provided in (c) above), whether or not there are negotiations subsequent to its receipt, unless the offer is withdrawn by written notice received by the Government prior to award. If subsequent negotiations are conducted, they shall not constitute a rejection or counter offer on the part of the Government.

(f) The right is reserved to accept other than the lowest offer and to reject any or all offers.

(g) The Government may award a contract, based on initial offers received, without discussion of such offers. Accordingly, each initial offer should be submitted on the most favorable terms from a price and technical standpoint which the offeror can submit to the Government.

(h) Any financial data submitted with any offer hereunder or any representation concerning facilities or financing will not form a part of any resulting contract; provided, however, that if the resulting contract contains a clause providing for price reduction for defective cost or pricing data, the contract price will be subject to reduction if cost or pricing data furnished hereunder is incomplete, inaccurate, or not current.

11. GOVERNMENT-FURNISHED PROPERTY. No material, labor, or facilities will be furnished by the Government unless otherwise provided for in the solicitation.

12. LABOR INFORMATION. General information regarding the requirements of the Walsh-Healey Public Contracts Act (41 U.S.C. 35-45), the Contract Work Hours Standards Act (40 U.S.C. 327-330), and the Service Contract Act of 1965 (41 U.S.C. 351-357) may be obtained from the Department of Labor, Washington, D.C. 20210, or from any regional office of that agency. Requests for information should include the solicitation number, the name and address of the issuing agency, and a description of the supplies or services.

13. SELLER'S INVOICES. Invoices shall be prepared and submitted in quadruplicate (one copy shall be marked "original") unless otherwise specified. Invoices shall contain the following information: Contract and order number (if any), item numbers, description of supplies or services, sizes, quantities, unit prices, and extended totals. Bill of lading number and weight of shipment will be shown for shipments made on Government bills of lading.

14. SMALL BUSINESS CONCERN. A small business concern for the purpose of Government procurement is a concern, including its affiliates, which is independently owned and operated, is not dominant in the field of operation in which it is submitting offers on Government contracts, and can further qualify under the criteria concerning number of employees, average annual receipts, or other criteria, as prescribed by the Small Business Administration. (See Code of Federal Regulations, Title 13, Part 121, as amended, which contains detailed industry definitions and related procedures.)

15. CONTINGENT FEE. If the offeror, by checking the appropriate box provided therefor, has represented that he has employed or retained a company or person (other than a full-time bona fide employee working solely for the offeror) to solicit or secure this contract, or that he has paid or agreed to pay any fee, commission, percentage, or brokerage fee to any company or person contingent upon or resulting from the award of this contract, he shall furnish, in duplicate, a complete Standard Form 119, Contractor's Statement of Contingent or Other Fees. If offeror has previously furnished a completed Standard Form 119 to the office issuing this solicitation, he may accompany his offer with a signed statement (a) indicating when such completed form was previously furnished, (b) identifying by number the previous solicitation or contract, if any, in connection with which such form was submitted, and (c) representing that the statement in such form is applicable to this offer.

16. PARENT COMPANY. A parent company for the purpose of this offer is a company which either owns or controls the activities and basic business policies of the offeror. To own another company means the parent company must own at least a majority (more than 50 percent) of the voting rights in that company. To control another company, such ownership is not required; if another company is able to formulate, determine, or veto basic business policy decisions of the offeror, such other company is considered the parent company of the offeror. This control may be exercised through the use of dominant minority voting rights, use of proxy voting, contractual arrangements, or otherwise.

17. EMPLOYER'S IDENTIFICATION NUMBER. (Applicable only to advertised solicitations.) The offeror shall insert in the applicable space on the offer form, if he has no parent company, his own Employer's Identification Number (E.I. No.) (Federal Social Security Number used on Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941), or, if he has a parent company, the Employer's Identification Number of his parent company.

18. CERTIFICATION OF INDEPENDENT PRICE DETERMINATION.

(a) This certification on the offer form is not applicable to a foreign offeror submitting an offer for a contract which requires performance or delivery outside the United States, its possessions, and Puerto Rico.

(b) An offer will not be considered for award where (a)(1), (a)(3), or (b) of the certification has been deleted or modified. Where (a)(2) of the certification has been deleted or modified, the offer will not be considered for award unless the offeror furnishes with the offer a signed statement which sets forth in detail the circumstances of the disclosure and the head of the agency, or his designee, determines that such disclosure was not made for the purpose of restricting competition.

(See Page L-4, Paragraph L-20c)

19. ORDER OF PRECEDENCE. ~~In the event of an inconsistency between~~ provisions of this solicitation, the inconsistency shall be resolved by giving precedence in the following order: ~~(a)~~ the Schedule; (b) ~~Solicitation Instructions and Conditions~~; (c) General Provisions; (d) other provisions of the contract, whether incorporated by reference or ~~otherwise; and (e) the specifications.~~

☆ U. S. Government Printing Office: 1978—661-647/4041

L-20. ALTERATIONS TO STANDARD FORM 33-A (REV. 1-78) SOLICITATION INSTRUCTIONS AND CONDITIONS.

a. Paragraphs 7 and 8 on page L-1 are deleted and the following is substituted therefor:

"7. LATE PROPOSALS, MODIFICATIONS OF PROPOSALS, OR WITHDRAWALS OF PROPOSALS (1979 MAR)

(a) Any proposal received at the office designated in the solicitation after the exact time specified for receipt will not be considered unless it is received before award is made; and

(i) it was sent by registered or certified mail not later than the fifth calendar day prior to the date specified for receipt of offers (e.g., an offer submitted in response to a solicitation requiring receipt of offers by the 20th of the month must have been mailed by the 15th or earlier); or,

(ii) it was sent by mail (or telegram if authorized) and it is determined by the Government that the late receipt was due solely to mishandling by the Government after receipt at the Government installation; or

(iii) it is the only proposal received.

(b) Any modification of a proposal except a modification resulting from the Contracting Officer's request for "best and final" offer, is subject to the same conditions as in (a)(i) and (ii) above.

(c) A modification resulting from the Contracting Officer's request for "best and final" offer received after the time and date specified in the request will not be considered unless received before award and the late receipt is due solely to mishandling by the Government after receipt at the Government installation.

(d) The only acceptable evidence to establish:

(i) the date of mailing of a late proposal or modification sent either by registered or certified mail is the U. S. or Canadian Postal Service postmark on the wrapper or on the original receipt from the U. S. or Canadian Postal Service. If neither postmark shows a legible date, the proposal or modification of proposal shall be deemed to have been mailed late. (The term "postmark" means a printed, stamped, or otherwise placed impression (exclusive of a postage meter machine impression) that is readily identifiable without further action as having been supplied and affixed on the date of mailing by employees of the U. S. or Canadian Postal Service. Therefore, offerors should request the postal clerk to place a hand cancellation bull's-eye "postmark" on both the receipt and the envelope or wrapper.)

(ii) the time of receipt at the Government installation is the time/date stamp of such installation on the proposal wrapper or other documentary evidence of receipt maintained by the installation.

(e) Notwithstanding the above, a late modification of an otherwise successful proposal which makes its terms more favorable to the Government will be considered at any time it is received and may be accepted.

(f) Proposals may be withdrawn by written notice or telegram received at any time prior to award. Proposals may be withdrawn in person by an offeror or his authorized representative, provided his identity is made known and he signs a receipt for the proposal prior to award.
NOTE: The term "telegram" includes "mailgrams."

b. DISCOUNTS. Clause 10 of the General Provisions shall govern in lieu of subparagraph (b) of Clause 9, "Discounts," on Standard Form 33-A (Rev. 1-78).

c. Paragraph 19 on page L-2 is deleted and the following paragraph is substituted therefor:

"19. ORDER OF PRECEDENCE (1973 APR). In the event of an inconsistency between provisions of this solicitation, the inconsistency shall be resolved by giving precedence in the following order: (a) the Schedule (excluding the specifications); (b) terms and conditions of the solicitation, if any; (c) General Provisions; (d) other provisions of the contract, when attached or incorporated by reference; and (e) the specifications."

L-21. AVAILABILITY OF SPECIFICATIONS, STANDARDS AND DESCRIPTIONS (1977 JUN). Specifications, standards and descriptions cited in the solicitation are available as indicated below:

(a) Unclassified Federal, Military and Other Specifications and Standards (Excluding Commercial), and Data Item Descriptions. Submit request on DD Form 1425 (Specifications and Standards Requisition) to:

Commanding Officer
U. S. Naval Publications and Forms Center
5801 Tabor Avenue
Philadelphia, Pennsylvania 19120

The Acquisition Management Systems and Data Requirements Control List, DoD Directive 5000.19-L, Volume II, may be ordered on the DD Form 1425. The Department of Defense Index of Specifications and Standards (DODISS) may be purchased from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C., 20402. When requesting a specification or standard, the request shall indicate the title, number, date and any applicable amendment thereto by number and date. When requesting a data item description, the request shall cite the applicable data item number set forth in the solicitation. When DD Form 1425 is not available, the request may be submitted in letter form, giving the same information as listed above, and the solicitation or contract number involved. Such requests may also be made to the activity by Telex No. 834295, Western Union No. 710-670-1685, or telephone (Area Code 215-697-3321) in case of urgency.

(b) Commercial Specifications, Standards and Descriptions. These specifications, standards and descriptions are not available from Government sources. They may be obtained from the publishers.

L-22. ARITHMETIC DISCREPANCIES. (a) For the purpose of initial evaluation of bids, the following will be utilized in resolving arithmetic discrepancies found on the face of the bidding schedule as submitted by bidders:

(1) Obviously misplaced decimal points will be corrected:

(2) In case of discrepancy between unit price and extended price, the unit price will govern;

(3) Apparent errors in extension of unit prices will be corrected; and

(4) Apparent errors in addition of lump-sum and extended prices will be corrected.

(b) For the purposes of bid evaluation, the Government will proceed on the assumption that the bidder intends his bid to be evaluated on the basis of the unit prices, extensions, and totals arrived at by resolution of arithmetic discrepancies as provided above and the bid will be so reflected on the abstract of bids.

L-23. NOTICE OF TOTAL SMALL BUSINESS SET-ASIDE (1972 JUL). (a) Restriction. Offers under this procurement are solicited from small business concerns only and this procurement is to be awarded only to one or more small business concerns. This action is based on a determination by the Contracting Officer, alone or in conjunction with a representative of the Small Business Administration that it is in the interest of maintaining or mobilizing the Nations's full productive capacity, in the interest of war or national defense programs, or in the interest of assuring that a fair proportion of Government procurement is placed with small business concerns. Offers received from firms which are not small business concerns shall be considered nonresponsive and shall be rejected.

(b) Definition. A "small business concern" is a concern, including its affiliates, which is independently owned and operated, is not dominant in the field of operation in which it is offering on Government contracts, and can further qualify under the criteria set forth in regulations of the Small Business Administration (Code of Federal Regulations, Title 13, Section 121.3-8). In addition to meeting these criteria, a manufacturer or a regular dealer submitting offers in his own name must agree to furnish in the performance of the contract end items manufactured or produced by small business concerns: Provided, that this additional requirement does not apply in connection with construction or service contracts.

L-24. SMALL BUSINESS SIZE STANDARD. The supplies or services to be procured under this solicitation are classified in Standard Industrial Classification Code 8911. For the purpose of this procurement, to qualify as a small business concern, in addition to being independently owned and operated and not dominant in field of operation in which it is bidding on Government contracts, the average annual receipts of the concern and its affiliates for the preceding three fiscal years must not have exceeded $7.5 million.

L-25. RESTRICTION OF DATA. Should your proposal include information which you do not wish disclosed to the public or used by the Government for any purpose other than evaluation of the proposal, the title page should be marked with the following legend:

> This data, furnished in connection with Request for Proposal No. DACW66-82-R-0022 shall not be disclosed outside the Government and shall not be duplicated, used, or disclosed in whole or in part for any purpose other than to evaluate the proposal; provided, that if a contract is awarded to this offeror as a result of or in connection with the submission of this data, the Government shall have the right to duplicate, use, or disclose the data to the extent provided in the contract. This restriction does not limit the Government's right to use information contained in the data if it is obtained from another source without restriction. The data subject to this restriction is contained in Sheets _____. (1966 DEC)

The offeror shall mark each sheet of data which he wishes to restrict with the following legend:

> Use or disclosure of proposal data is subject to the restriction on the Title page of this Proposal. (1966 DEC)

L-26. PROPOSAL COST BREAKDOWN. (a) The offeror shall furnish with his proposal a cost breakdown of the offered price by the usual categories of Labor, Material, Overhead, Travel, G&A, Profit, etc. Offerors may use their own standard format.

(b) Offerors are encouraged to submit any other cost or financial information which may be helpful in the understanding and evaluation of their cost proposal; however, superfluous or elaborate documents are not desired.

L-27. NOTICE OF LABOR SURPLUS AREA OBLIGATION (JULY 1978). The site of work to be accomplished under the contract to be awarded is located in an area designated by the Secretary of Labor as a Labor Surplus Area and the contract to be awarded thereunder contains specific obligations to benefit Labor Surplus Areas. Accordingly, attention of all bidders is called to the contract clause entitled "Labor Surplus Area Expenditure Requirements" requiring the successful contractor and sub-contractors to incur a substantial proportion of their aggregate costs in any Labor Surplus Area. The office issuing this solicitation will furnish a list of Labor Surplus Areas upon request.

SECTION M - EVALUATION FACTORS FOR AWARD

1. Evaluation of Proposals. Offeror's proposals shall be examined and evaluated based on the factors listed below. It is the responsibility of the offeror to provide information, evidence or exhibits which clearly demonstrates the ability to satisfactorily respond to contract requirements and the factors listed below. All proposals must include price proposals to be considered for award.

2. The evaluation of offeror's proposals shall be performed in two stages. The initial evaluation shall be performed for the purpose of determining those proposals considered to be within the "competitive range". All proposals determined to be technically acceptable and which have a reasonable chance of being selected for award shall be considered to be within the "competitive range". Selection for award of the contract shall be made from those proposals considered to be within the "competitive range". Factors that shall be utilized for the initial evaluation are as follows, listed in relative order of importance:

a. Cost of Work. All proposals must include a price proposal and a proposal cost breakdown as specified in paragraph L-26 to be considered for award.

b. Qualifications and Capabilities of Key Personnel. Proposals must clearly demonstrate that the capability, background and experience of key personnel responsible for the administration and servicing of the contract are such to insure successful performance of the work effort required by the contract.

c. Specialized Experience in the Work Required. Proposal must clearly demonstrate the offeror's full experience in completing projects of the same magnitude, complexity, and nature as those required by the contract.

d. Understanding of Scope of Work. Proposals must document a complete understanding of the details and purposes of all facets of the Scope of Work.

e. Familiarity with the Region and Locality. Proposal must document that key personnel including the Principal Investigator and other appropriate supervisors posses extensive knowledge of regional and local culture history (ex: archeological phases, time periods, artifact typologies and other classificatory units and historical data) as well as local and regional working conditions included within the contract.

f. Capability to Complete the Work in the Required Time. Proposal must clearly demonstrate the ability of the offeror to provide the required number of competent personnel and the facilities within the time frame required by the contract and to satisfactorily complete work assignments within the time requirements of the contract.

The Government may contact any or all references submitted by the offeror and may utilize information contained within the Corps of Engineers Architect-Engineer Contract Administration Support System (ACASS) to verify information

provided within the offeror's proposal. Failure to respond to any of the above evaluation factors shall result in the offeror's proposal not being evaluated for the omitted factor or factors.

3. Following the initial evaluation, the Government may elect to conduct discussions with all offerors submitting proposals considered to be within the "competitive range". On completion of discussions, offerors shall be afforded the opportunity to submit a "best and final" offer for consideration by the Government. However, the Government reserves the right to award the contract, based on initial offers received, without discussion of such offers. In either case, offeror's proposals shall be evaluated for award based on factors a, b, c and d, as listed in their relative order of importance in paragraph 1, above. Factor "a" is the predominant factor in the final evaluation.

4. The contract shall then be awarded to that responsible offeror whose offer conforming to the solicitation is considered to be most advantageous to the Government, price and other factors considered.

DEPARTMENT OF THE ARMY
MEMPHIS DISTRICT, CORPS OF ENGINEERS
668 CLIFFORD DAVIS FEDERAL BUILDING
MEMPHIS, TENNESSEE 38103

Reply to Attention of:

STATEMENT OF EQUIVALENT RATES FOR FEDERAL HIRES

In accordance with the Service Contract Act of 1965, as amended, regulations of the Secretary of Labor in 29 CFR Part 4, and DAR 12-1005.2(b)(3), this statement serves the following purposes:

For attachment to Notice of Intention to Make A Service Contract (SF-98) sent to the Secretary of Labor, Notice No. A 1119736

For inclusion in the solicitation for bids and resulting contract in excess of $2,500.00 subject to the Service Contract Act of 1965 as amended.

RATES FOR EQUIVALENT FEDERAL HIRES
FOR INFORMATION ONLY
(see also the clause of like title elsewhere in this solicitation)

As required by the above-cited law and regulations, the information set forth in the following five (5) numbered items constitutes a statement of rates for equivalent Federal hires, setting forth those fringe benefits and wage rates that would be paid by this Federal contracting activity to the various classes of service employees expected to be utilized under the contract if 5 U.S.C. 5341 (Wage Board - blue collar) and/or 5 U.S.C. 5332 (General Schedule - white collar) were applicable.

1. Contribution of five point one (5.1) percent of basic hourly rate for health and insurance.

2. Contribution of seven (7) percent of basic hourly rate for retirement.

3. Nine (9) paid holidays as follows:

New Year's Day
Washington's Birthday
Memorial Day
Independence Day
Labor Day
Columbus Day
Veterans' Day
Thanksgiving Day
Christmas Day

4. Paid annual leave (vacation) as follows:

a. Two (2) hours of annual leave each week for an employee with less than three (3) years of service.

b. Three (3) hours of annual leave each week for an employee with three (3) but less than fifteen (15) years of service.

c. Four (4) hours of annual leave each week for an employee with fifteen (15) or more years of service.

Statement continued on page 2

5. Basic hourly rates by classification as follows:

Federal Employee Classes	Wage Board (Blue Collar) Grade Step	General Schedule (White Collar) Grade Step	Basic Hourly Wage Rate
Principal Investigator (Archaeologist)		GS 12/01	$ 13.58
Archeological Project Director		GS 11/01	11.33
Archeological Crew Chief		GS 07/01	7.65
Archeological Laborer		GS 03/01	4.93
Geomorphologist/Sedimentologist		GS 11/01	11.33
Zooarcheologist		GS 11/01	11.33
Paleobotanist		GS 11/01	11.33
Ecologist		GS 11/01	11.33
Draftsman/Illustrator		GS 07/01	7.65
Editor		GS 09/01	9.37
Typist		GS 03/01	4.93
Architectural Historian		GS 11/01	11.33

Bidders and/or the contractor are advised that:

a. The wage rates and fringe benefits set forth in this Statement are not those required to be paid to the contractor's service employees who will perform under the contract to be awarded. The listing of such wage rates and fringe benefits is only intended as information to show those that would be paid by this Federal agency to such workers if they were employed directly by the government and subject to the pay provisions of 5 USC 5341 or 5332.

b. The minimum wage rates and fringe benefits required to be paid under the contract are those contained in the Secretary of Labor's wage determination (if one has been made) included in this solicitation, and where no such determination has been made the wages and fringe benefits specified in the contract clause entitled "Service Contract Act of 1965, as Amended."